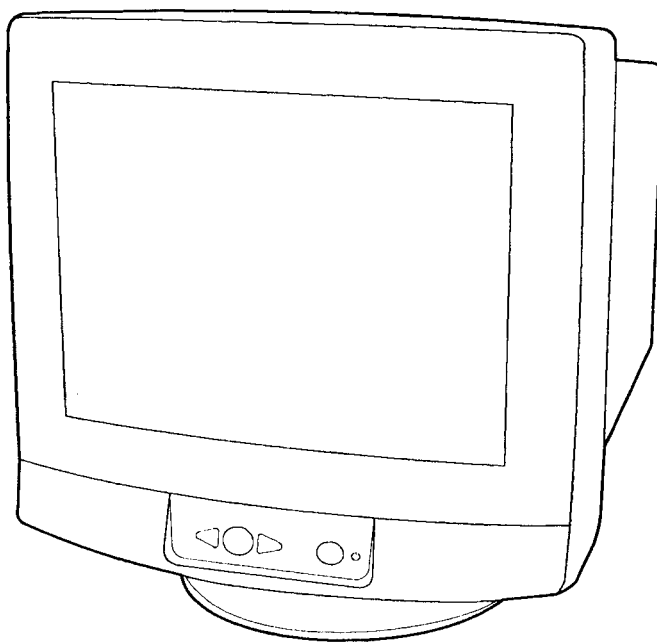


Service Manual

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Chassis 447I = 447 I / Zi

17" High Resolution Colour Monitor 447Zi



Contents

Service
Monitor Dismantling
Part List
PCB Part List
PCB Layout pictures

Level

1

Main Board module SMA222G
CRT module SMH154F

When re-ordering manuals, please quote the model name and part number.

ZB1617
11.98

Service

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Revision History

Rev	Date	Prepared by	Comments
11.98	25.11.98	A.Ahola	

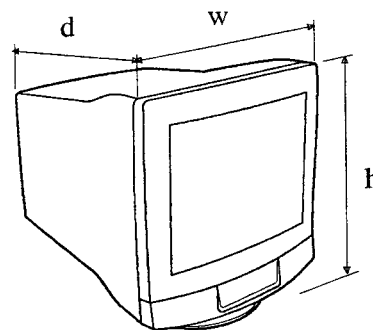
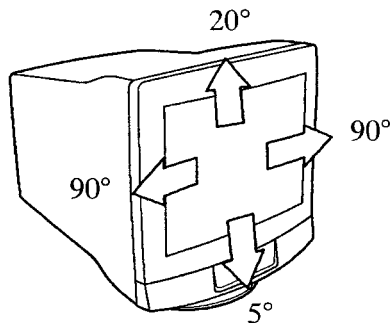
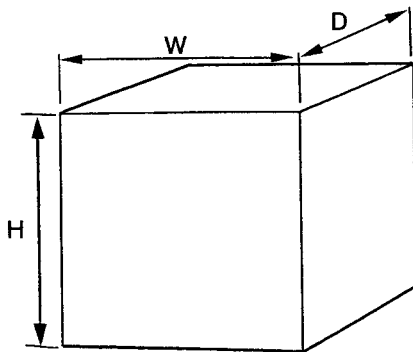
1. Product Overview

4471 is a 17 inch monitor. The maximum resolution of 1280 x 1024 makes the monitor suitable for PC, Macintosh and workstation applications in normally heated, ventialed and controlled office/home environment. The monitor has an own power supply with input voltage requirements from 90V to 264V.

1.1. Technical Specifications

Cathode Ray Tube	17" in diagonal, 90° deflection angle Antistatic, antireflex AGRAS coating Phosphor P22 medium short, Dot pitch 0.27 mm
Picture Size	300 mm x 225 mm with specified geometric distortion
Maximum Picture Size	325.5 mm x 244 mm, diagonally 406 mm (16,0")
Power Input Requirements	Voltage 90-264 V, 50/60 Hz Autosense Current 1.4 A/110 V, 0.7 A/240 V
Power Dissipation	< 80 W Normal Operation < 70 W Stand-by < 15 W Suspend < 5 W Auto power off < 0.1W Manual off
Memory Locations	9 for factory preset timings 10 for user adjusted timings
Geometric Distortion	The distance between bezel and active screen edge shall not vary more than 2 mm in both vertical and horizontal dimensions
Luminance	Min. 100 cdm ⁻² at center, with full white field
Video Input	Input Signal: RGB, analog, positive, max 0.7 V/75 Ω Horizontal addressability: 1280 dots maximum Vertical addressability: 1024 dots maximum
Synchronization Range	Horizontal: 30 kHz to 72 kHz automatic Vertical: 50 Hz to 120 Hz automatic
Synchronization Signal	Separate TTL, positive/negative Composite TTL, positive/negative
Max. Dot Frequency Capability	100 MHz
Temperature	Operating: +10°C to +40°C Packed: -20°C to +60°C
Humidity	Operating: 15% to 85 % Packed: 5% to 95 %
Weight	16 kg net 18 kg gross

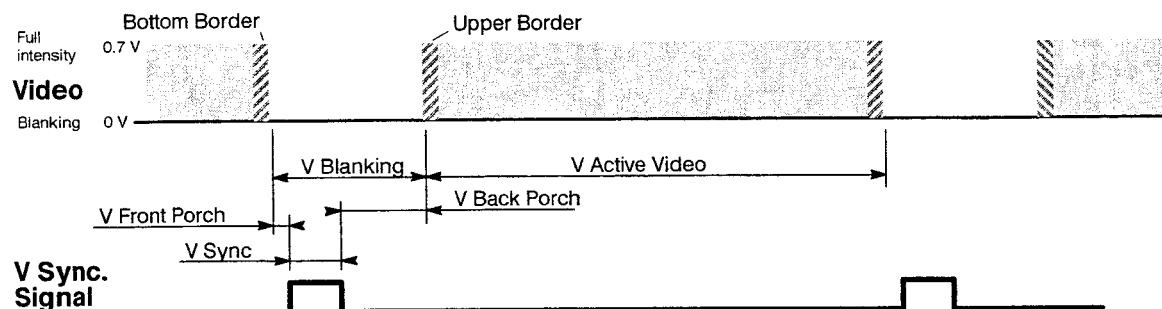
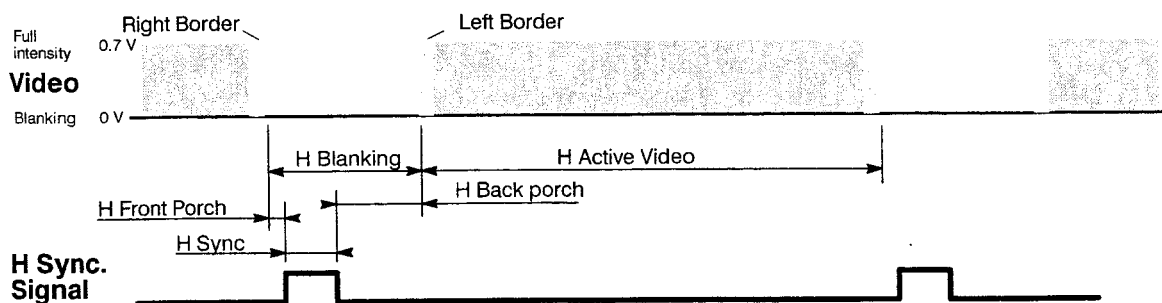
Size, Tilt and Swivel



Dimensions

Monitor	h	413 mm with optional stand
	h	391 mm with w/o stand
	w	422 mm
	d	427 mm
Package	H	567 mm
	W	540 mm
	D	580 mm

1.2. Preset Display Modes



Display mode Memory location ->	0	1	2	3	4	5	6	7	8
Display Mode Name	NCE513	NCE506	NCE011	NCE561	NCE406	NCE402	NCE300	NCE010	NCE602
H Frequency/kHz	68.677	60.023	68.861	61.101	46.875	48.077	31.472	49.718	63.953
H Period/ μ s	14.561	16.660	14.560	16.366	21.333	20.800	31.774	20.113	15.636
H Active Video/ μ s	10.836	13.003	11.520	11.903	16.162	16.000	25.420	14.527	11.636
H Resolution	1024	1024	1152	1024	800	800	640	832	1280
H Sync/ μ s	1.02	1.219	1.28	3.72	1.02	2.40	3.81	1.12	1.02
H Back Porch/ μ s	2.20	2.235	1.44	0.66	3.23	1.28	1.91	3.91	2.26
V Frequency/Hz	85.0	75.0	75.1	75.8	75.0	72.2	59.9	74.5	59.9
V Period/Lines	808	800	915	806	625	666	525	667	1067
V Resolution	768	768	870	768	600	600	480	624	1024
V Sync/Lines	3	3	3	8	3	6	2	3	5
V Back Porch/ Lines	36	28	39	30	21	23	33	39	37
H sync Polarity	+	+	-	+	+	+	-	-	-
V sync Polarity	+	+	-	+	+	+	-	-	-
H Front Porch/ μ s	0.51	0.20	0.32	0.08	0.32	1.12	0.64	0.56	0.72
V Front Porch/ Lines	1	1	3	1	1	37	10	1	1
Dot Frequency/ MHz	94.500	78.750	100.000	86.030	49.500	50.000	25.177	57.275	110.000
Interlacing	no	no	no	no	no	no	no	no	no

Factory adjusted modes

Factory set modes

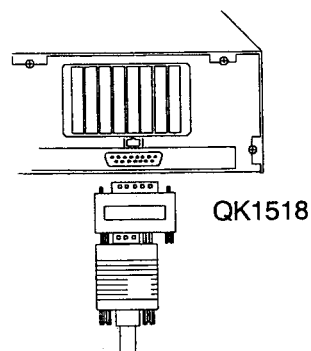
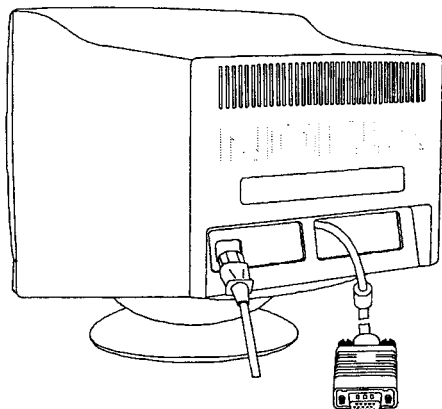
1.3. S-Capacitor table

F/kHz	S3	S2	S1	S0	Lin
	0	0	0	0	1
69.288					
	0	0	0	1	1
65.506					
	0	0	0	1	1
62.985					
	0	0	0	1	1
60.464					
	0	0	1	0	1
57.943					
	0	0	1	1	1
55.422					
	0	0	1	1	1
52.901					
	0	1	0	1	1
50.380					
	0	1	1	0	1
47.859					
	0	1	1	1	0
45.338					
	1	0	0	0	0
42.817					
	1	0	1	0	0
40.296					
	1	1	0	1	0
37.775					
	1	1	1	0	0
35.254					
	1	1	1	1	0
32.733					
	1	1	1	1	0
31.472					

1.4. Monitor Connection

Make sure that the monitor is disconnected from mains and the power switches of the computer and all attached devices are turned off before connecting the monitor.

- Connect the signal cable plug to the videocontroller connector at the back of the computer.
- Tighten the screws on the plug by hand.
- Connect the power cord first to the monitor and then to a grounded power outlet.



If your monitor is DDC compatible (PC)

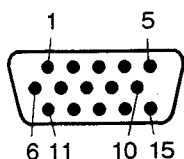
- Do not use any adaptor when connecting signal cable to your computer.
- Do not extend the signal cable with extension lead. The DDC signals will not accept extended cable.

If there is no DDC in your computer (PC)

- Normally there is no need for adaptor when connecting signal cable to your computer.
 - Use MAC adaptor (QK1518) in signal cable when connecting the monitor to an Apple Macintosh computer.
 - If the computer is equipped with separate display adapter card. It may have a standard D-SUB connector. In that case MAC adaptor is not needed.

Signal connector

Pin		Signal
1	->	RV Red video
2	->	GV Green video
3	->	BV Blue video
4	<-	ID2 ID2 (tied to LG)
5		Plugged/Unplugged (TEST)
6		RG Red ground
7		GG Green ground
8		BG Blue ground
9	->	Not connected
10		LG Logic ground
11	<-	ID0 ID0 (tied to LG)
12	<-	SDA DDC SDA
13	->	Hs Hor. sync., Comp. sync.
14	->	Vs Vert. sync.
15	<-	SCL DDC SCL

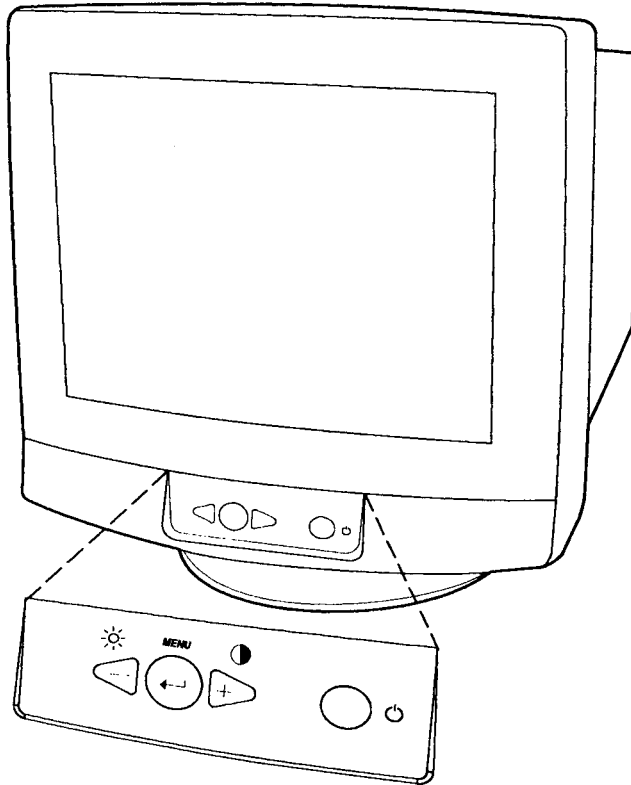


1.5. User Controls

1.5.1. Power Switch

Turning the Monitor ON and OFF

Push the **power switch** to turn the monitor on or off.



When the power is turned on, the **power-on indicator** will light.
The colour of the the power-on light indicates the operating state of the monitor.

- Green: The monitor is in Normal, Stand-by or Suspend operation.
- Blinking Green: The monitor is in Automatic Power off state.
- Not illuminated: The monitor is turned off with power switch or disconnected from mains outlet.

If the power management function working properly in your computer, you do not need to switch the monitor on or off. It happens automatically.



The power switch does not disconnect the monitor from mains. In order to make the monitor completely powerless, unplug the power cord from power outlet.

1.6.Menu

All adjustments and settings are covered with following main menu displays:

SIZE & POSITION

SHAPE

COLOR

MISCELLANEOUS

Menu line written in upper section of the menu display is a headline of another menu display.

Menu lines written in lower section contain a property which you may adjust or perform settings.

1.6.1. *Moving in the menu*

Menu operations are controlled with  button and -/+ buttons.

- Ⓐ Call the menu to the screen by pushing  button.
- Ⓑ Select the header with -/+ buttons.
- Ⓒ Push  to confirm the selection.

Adjustment and settings corresponding the header appear below the header field.

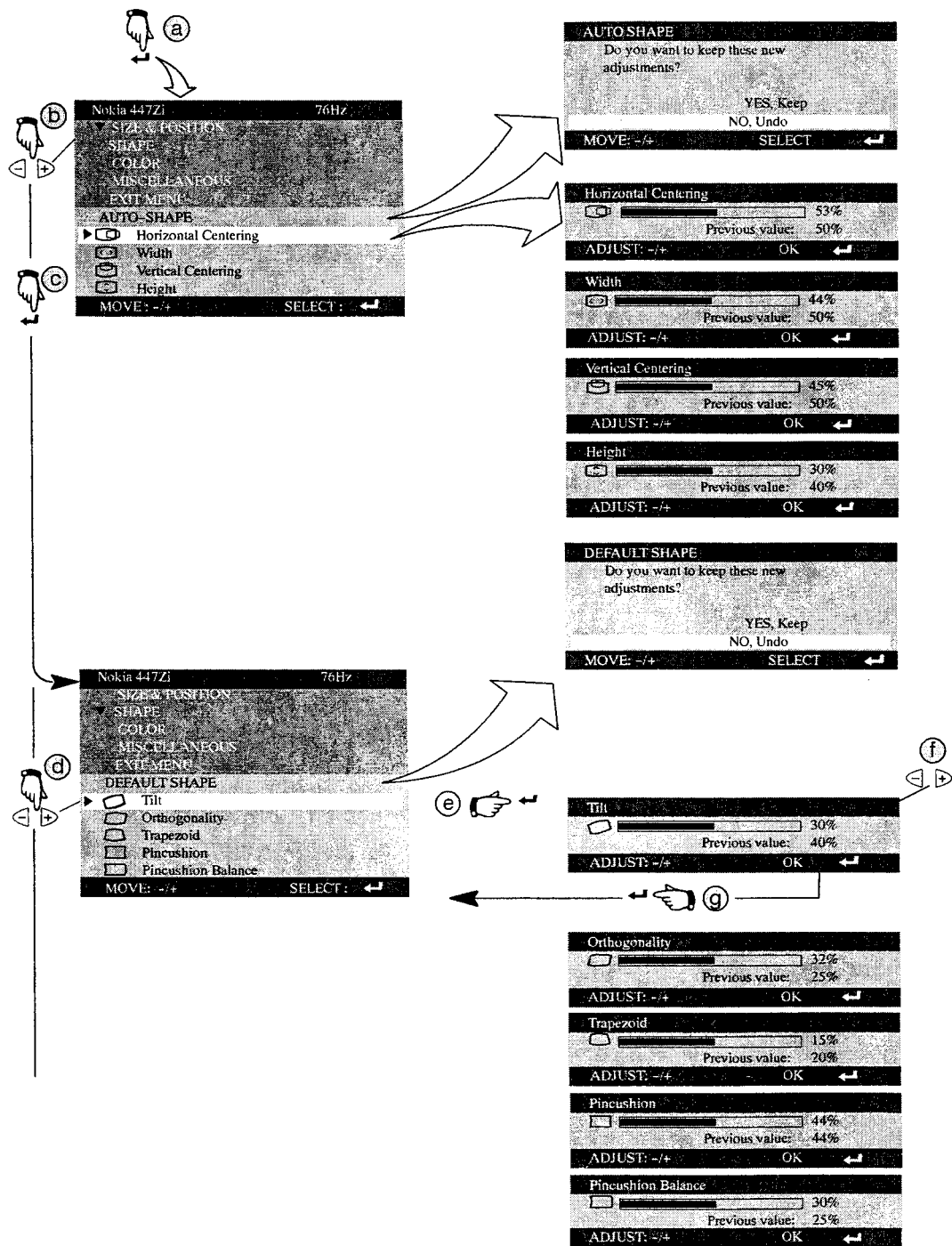
- Ⓓ Select the adjustment with -/+ buttons.
- Ⓔ Push  to confirm the selection.

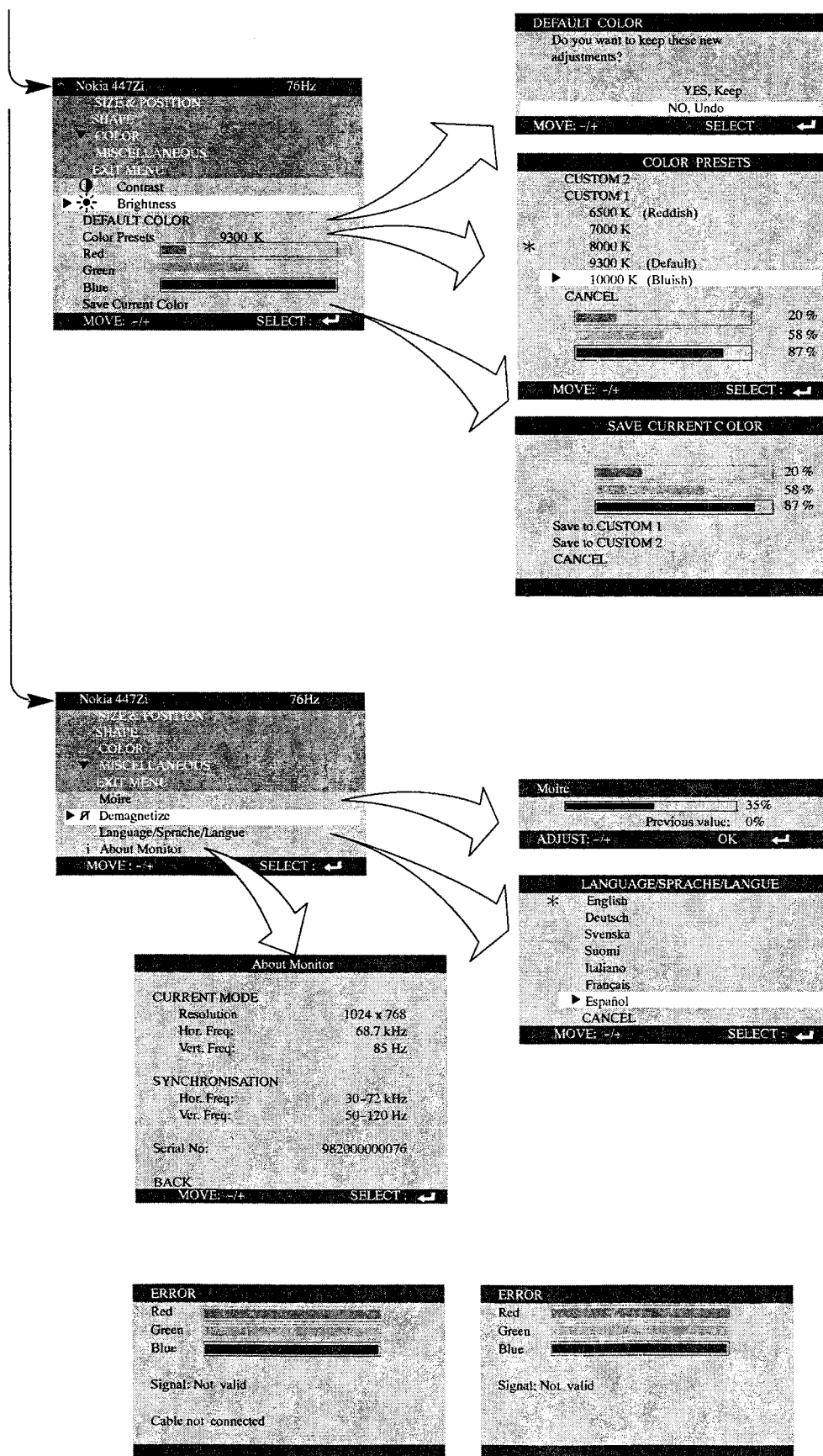
Menu disappears and a scale shows the position of the adjustment. In addition to the bar, position of the adjustment is shown as a percentage of the maximum value. The upper number shows the current value and the lower one shows the value where the adjustment started.

- Ⓕ Adjust with -/+ buttons.
- Ⓖ When ready, push  button.

1.6.2. *Exit Menu*

All displays disappear automatically in 20 seconds or at once by selecting **EXIT MENUS** and pushing  button.





2. Site Preparation

2.1. Location

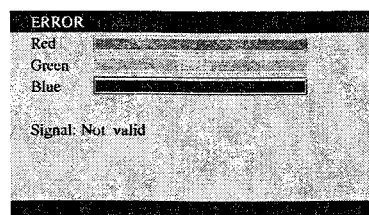
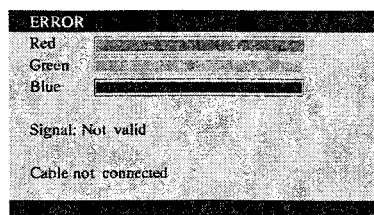
This Monitor is designed for normal office conditions. It is equipped with own power supply. It is not to be serviced or repaired on site

2.2. Troubleshooting

Local service facilities should perform simple maintenance such as trimming. More advanced maintenance and repair that requires replacement of components which in turn requires testing and re-trimming should be carried out in a central workshop.

Symptom		Measures
Picture screen is blank	The indicator on the front panel is not illuminated	Check that the power cord is correctly connected to the monitor and to the power outlet. If the monitor is powered through the computer, check that the computer is switched on with the mains switch. Use a desk light, for example, to verify that current is connected to a power outlet. If no electricity is connected to the outlet, call an electrician.
		Unplug the monitor from power outlet for about one minute.
	The indicator on the front panel is illuminated	Check that the signal cable connector is connected. If the connector is loose tighten the connector's screws.
		The Monitor might be in stand-by position. Push one of the buttons or move the mouse.
		Unplug the monitor from outlet for about one minute.
		Switch off the monitor and the computer. Remove the signal cable from the computer. Switch on the monitor using the power switch. If the Selftest menu appears on the screen, it is evident that the monitor functions correctly and the problem is caused by an error in other parts of the system.
		Check the signal cable's connection pins. If the pins are slightly distorted, use nose pliers to straighten them.
		The Selftest menu appears. The computer may use a timing values which are out of the monitor's synchronization range.
Picture has colour defects	Demagnetize the monitor.	
	If colour defect is repeated without the monitor having been moved, it is possible that the monitor is influenced by a strong magnetic interference field (near to a high power cable, for example). Try to find a better location for the monitor or the interference source. Note that another monitor placed too near (less than 30 cm.) may also generate interference in the picture.	
Picture has strong colour defect,	Open the Miscellaneous/Selftest menu. Check the colour of the Red, Green and Blue bars. If they have pure colours, the fault is not in the monitor. Check signal cable connectors and the computer. If the menu itself and the colour bars are discoloured, the monitor is obviously damaged.	
Picture is stable but distorted	Your computer may use a timing for which the corresponding picture characteristic adjustments have not been set at the factory. Adjust the picture characteristics	
Picture is unstable	Check the proximity of other electrical devices that generate magnetic fields, such as speakers, other monitors, electric fans and fluorescent light fixtures. Make sure your computer and video card are properly configured for your monitor.	

The automatic appearance of the Error menu on the screen means that the signal is faulty or missing.



2.3. Checking the Operation of PowerSaver

The proper operation of the function requires a computer with VESA DPMS power management capabilities. Note that the power saving feature must be activated in the computer when checking the operation.

State	Colour of the power-on indicator	5V	Heater	12V	Video
Normal Operation	Green	Yes	Yes	Yes	Yes
Stand-by	Green	Yes	Yes	Yes	No
Suspend	Green	Yes	Yes	No	No
Power Off	Blinking Green	Yes	No	No	No



DPMS (Display Power Management Signaling) is a trade mark of Video Electronics Standard Association (VESA)

3. Controlling the Memory for Picture Adjustments

The picture adjustment values are stored in non-volatile memory. The memory has separated areas for User Adjustments and for Factory Adjustments.

3.1. Memory for User Adjustments

3.1.1. Adjustment

- 1 If there are values available in the memory for user adjustments, corresponding to the present timing signals, they are always used.
- 2 New user made adjustments are stored to the memory for user adjustments.

3.1.2. Resetting the User made settings for geometry or image

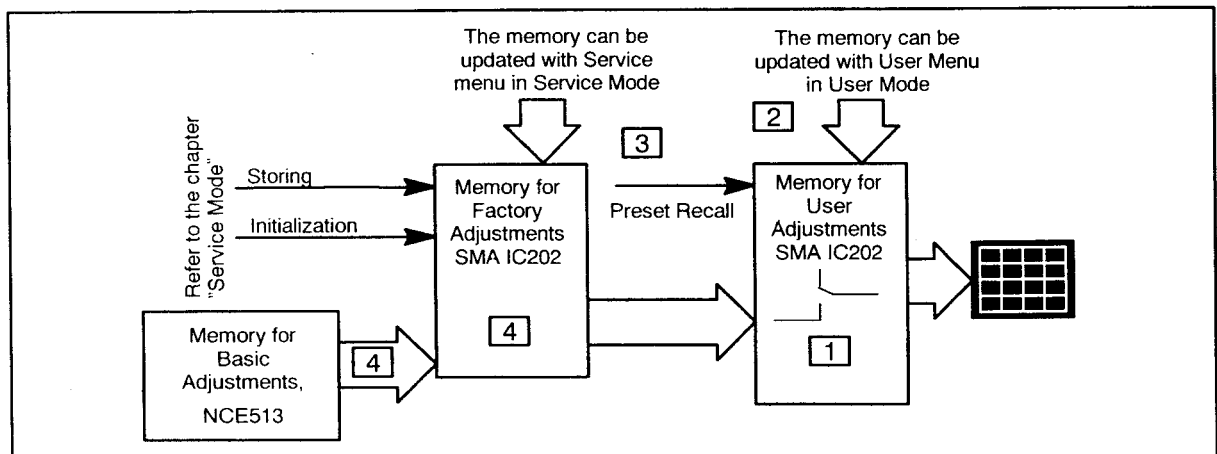
- 3 User memory can be emptied from user made settings. **Resetting affects only the timing which is currently active.** The reset function is inhibited if no corresponding factory preset display mode exists.

After resetting all picture properties are coming from memory for factory adjustments.

3.2. Memory for Factory Adjustments

3.2.1. Adjustment

- 4 Factory adjustments can be updated with service menu in service mode. If there is no location in factory adjustment memory for timings currently in use, the adjustment affects the memory for user adjustments.
 - If the memory location mentioned in case 1 is empty, the picture adjustment values are read from memory for factory adjustments. Factory adjustments, corresponding to the current timings, are transferred to user memory if any picture property is adjusted. After that the operation is as in case 1.



4. Service Mode

Service Mode is needed for updating of the factory adjustments for timings listed in the chapter Pre-set Display Modes. If there is no location in factory adjustment memory for display mode currently in use, the adjustment affects the memory for user adjustments.

4.1. Grouping of the Adjustments

There are three groups of software adjustments in service mode:

- Geometry set
- Grey Scale adjustment set

The following table shows how the adjustments act in relation to the display modes.

Adjustment	Common for all Display modes	Separate for each Display mode	Available in User Mode	Available in Service Mode
Horizontal Position		X	X	X
Vertical Position		X	X	X
Height		X	X	X
Width		X	X	X
Pincushion		X	X	X
Pincushion balance		X	X	X
Trapezoid		X	X	X
Orthogonality		X	X	X
Vertical S-Corr		X		X
Vertical C-corr		X		X
Tilt	X			X
Moire	X			X
Raster	X			X
G2	X			X
Min contrast	X			X
Max contrast	X			X
R Black level	X			X
G Black level	X			X
B Black level	X			X
R Ampl	X		X	X
G Ampl	X		X	X
B Ampl	X		X	X

Common adjustments need to be adjusted only once. Separate adjustment must be performed for every display mode to be stored

4.2. Service Menu

4.2.1. Access to Service Mode

Active the service mode always in 68.677 kHz/85 Hz (NCE513).

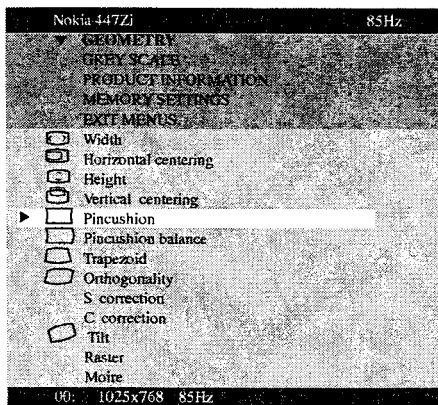
First switch OFF the monitor with power switch.

- 1) Push -button down.
- 2) While keeping -button down, switch ON the monitor.
- 3) After power-on indicator is illuminated release -button and press - / + buttons down.
- 4) Release - / + buttons and press -button down.
- 5) Release -button.

Select the items in the Menu with - / + buttons. Push -button to open Geometry, Grey Scale, Product Information, Memory Settings or Edit Menus submenu. Adjust each property with - / + buttons.

4.2.2. Geometry and Geometry Advanced

Geometry submenus contain placement, size and shape adjustments.

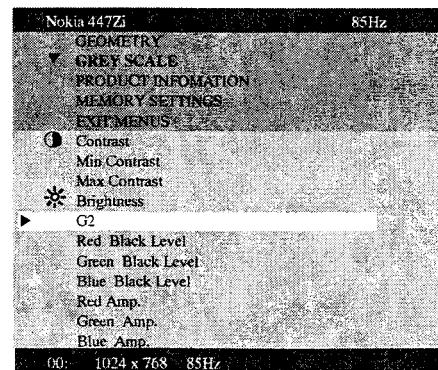


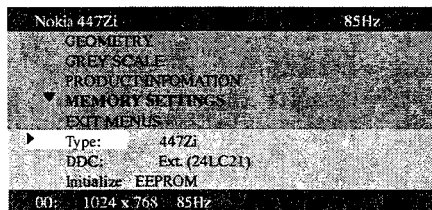
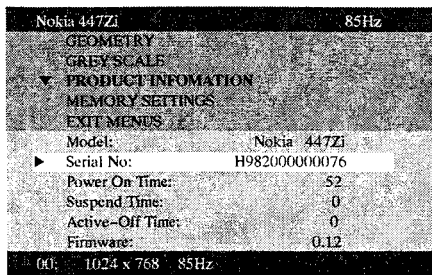
4.2.3. Grey Scale

This monitor has six preset tints. With tint numbers smaller than 4 the picture becomes reddish and with tint numbers greater than 4 the picture turns blue.

Tint no	1	2	3	4	5	6	7
Colour Temperature	5000K	6000K	6500K	7000K	8000K	9300K	10000K

The grey scale adjustment affects directly tint number 6 (9300K) only. Other tints are derived automatically from 9300K colour temperature.





4.2.4. Initializing the Replacement IC501 on SMA board

If the memory for factory adjustments is replaced, it must be initialized. During initializing all memory locations are written with approximate values. They must be updated in service mode as explained in the chapter '7. Adjustment Procedure'.

- Activate service mode as explained before.
- Select Memory Settings.
- Use - / + buttons to select and -button to change Monitor Type (447I or 447Zi), the Type of the DDC (EXT or INT).
- Select Initialize EEPROM and push -button.
- Switch OFF the monitor.

Caution

Initializing of a programmed memory IC deletes all user and factory made adjustments.

4.2.5. Storing the adjustments

When the adjustment is ready, return to the menu by pushing -button. The new setting is stored automatically.

4.2.6. Exit from service mode

1. Select Exit Menus and press -button.
2. Switch off the monitor.

5. Workshop Maintenance

5.1. Important Safety Notice

The components, which are important for safety, are marked with special mark  on the circuit diagram. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent X-radiation, shock, fire or other hazards.

For your own safety, use always safety isolating transformer when repairing the monitor.

5.1.1. Discharging the CRT

High voltage circuitry includes bleeder resistor which normally discharges the tube in about 5 seconds after the power is switched off. If you – for safety reasons – want to be sure about the discharging, do as follows:

Wear safety goggles. A cracked CRT may implode when discharged.

The signal cable must be disconnected from the computer.

To discharge the CRT, a flat-head screwdriver with grounding cable is required.

- Disconnect the power cable.
- Connect the metal chassis of the monitor to reliable earth.
- Connect the grounding wire to the screwdriver.
- Connect the other end of the grounding wire to the chassis (earth).
- Insert the screwdriver under the rubber cap of the EHT connector to discharge the tube.
- Disconnect the power cable.

5.2. ESD-Sensitive Parts

To prevent damage, when working with electrostatic discharge (ESD) sensitive parts, observe the following instructions:

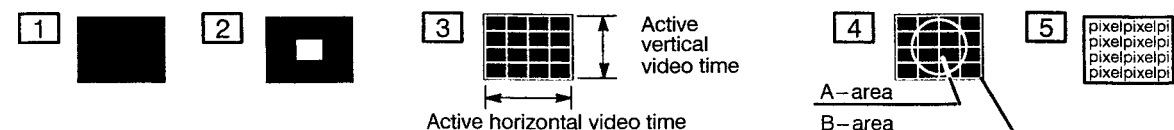
- Keep the ESD-sensitive part in its original shipping container until you are ready to install the part into the component card.
- Just before touching the ESD-sensitive part, discharge to the monitor any static electricity in your body; do this by touching the metal frame or cover of the machine. If possible, keep one hand on the frame when inserting or removing a logic card, for example.
- Hold the ESD-sensitive part by its edge; do not touch its pins.

5.3. Test Equipment

The following test equipment are required to adjustment procedure.

- Safety isolating transformer
- Digital multimeter: Fluke 87 or equivalent true RMS multimeter
- High voltage probe: e.g. Fluke 80-40k
- Signal generator: VTG220 + PC or programmable video generator
- Colour analyzer: e.g. Minolta TV Colour Analyzer CA100
- Convergence Gauge (CM7AR or equivalent)
- Oscilloscope 40-100 MHz band width
- Hi-Pot tester (Flash tester with insulation measurement / Leakage current / Break down voltage)
- ESD protection necessary

5.4. Test Patterns



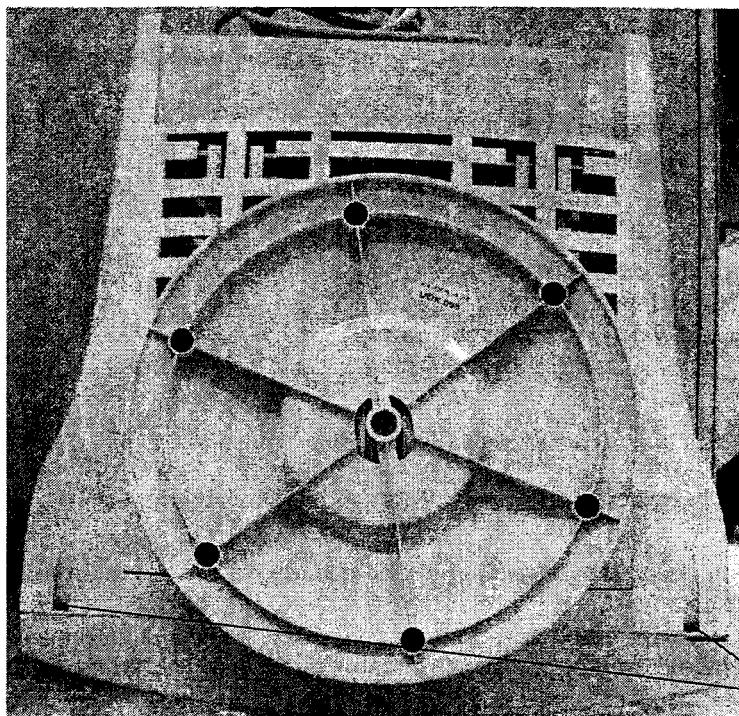
- 1** Black Picture
 - Signal level = 0 V at each RGB input
- 2** Highlight grey scale tracking
 - Signal level = 700 mV in the window at each RGB input
- 3** Crosshatch Picture
 - Squares e.g. 20 mm x 20 mm
 - Outmost lines correspond the active vertical/horizontal video time
- 4** Convergence test pattern
- 5** Focus test pattern

5.5. Disassembly

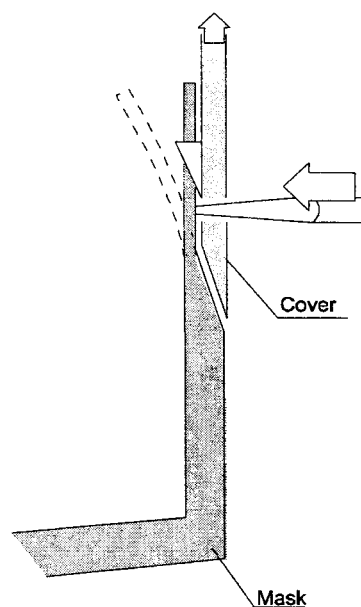
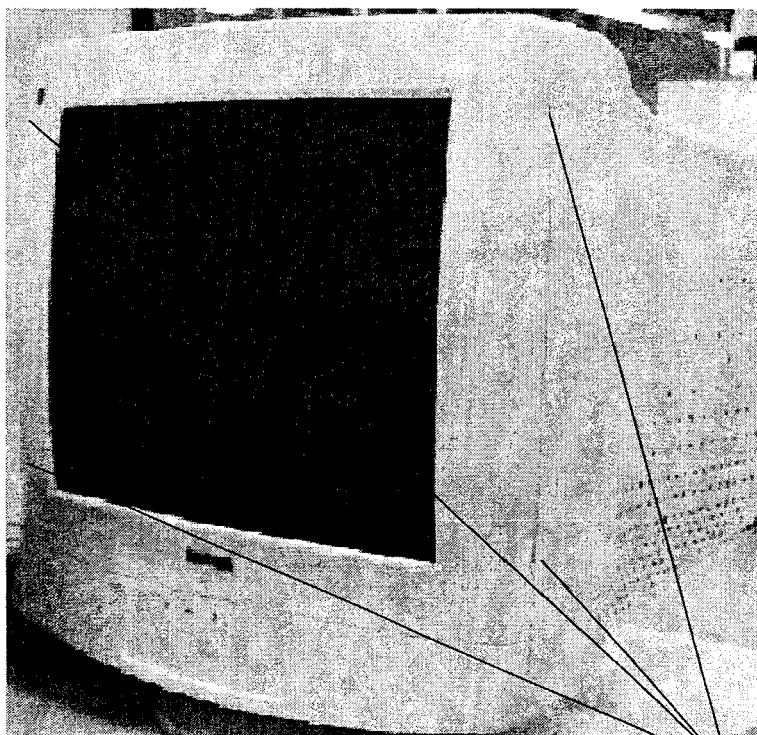
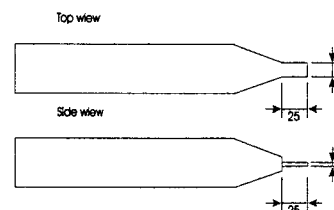
5.5.1. Cabinet

Set the monitor on cushion picture tube facing down

1. Loosen and remove two screws.
2. Open the plastic pawls with a screwdriver or the special tool (for instance 860006) push don't twist.



860006



6. Image Performance

Measurements to verify this specification shall be made with equipment that measures the displayed image as if it were projected forward onto flat panel tangent to the centre of the CRT face plate surface and perpendicular to the Z-axis of the CRT.

The following specifications are applicable over specified input power conditions, specified environmental operating conditions and after being subjected to the specified non-operating environmental conditions. Before performance measurements are done the monitor must be in room temperature ($20 \pm 5^{\circ}\text{C}$) for at least 2 hours. After that the monitor must have been warmed up with the power on for at least 20 minutes.

The monitor shall be positioned to a magnetic field which is specified as 0 G horizontal field and 0.45 G vertical field (northern hemisphere) whenever image performance is measured. The monitor shall be degaussed before the performance measurement are done.

If there is no standardized magnetic field available, the monitor should be positioned face to east. All image performance specifications will be met in diffuse ambient 500 lux.

6.1. Active Picture Size and Location

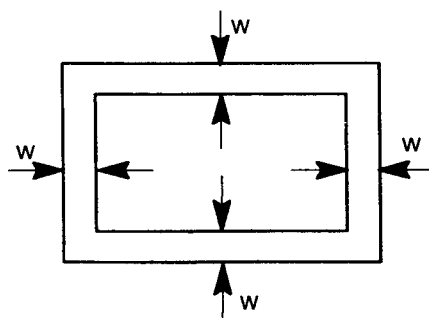
- Definition: Picture size is defined as the width and height of the display using the active raster, not including the border.
- Measurement: 16 x 12 Cross-hatch test pattern. Full white field illuminance 100 cdm^{-2} . The width and the height are measured via the centre of the screen.
- Requirements: Width = $300 \text{ mm} \pm 3.0 \text{ mm}$
Height = $225 \text{ mm} \pm 3.0 \text{ mm}$

Over the full range of operating temperature the size shall not change more than 3.0 mm.

The tolerance for the location of the active picture centre is $\pm 5.0 \text{ mm}$.
The location is measured from the bezel opening edge.

6.2. Geometrical Distortion

- The distance between bezel and active screen edge shall not vary more than 2.0 mm in vertical and horizontal direction.
- The requirement must be fulfilled with all factory pre-set modes. The measurements are done with maximum output luminance.

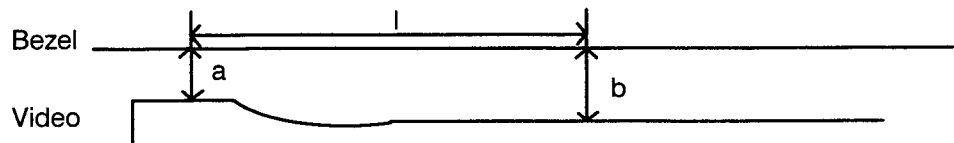


6.3. Straightness of Line Segment

- Definition: For any segment of an edge of the active picture the deviation from being straight is defined as the distance from the straight line formed by connecting the end points of the segment under test to the point on the line segment furthest from that construction.
- Measurement: The deviation is to be measured perpendicular to the constructed line (see figure)

$$\text{deviation} = a - b$$

$$\% \text{ deviation} = (a - b / l) \times 100 \%$$



- Requirements: For line segments longer than 100 mm the maximum deviation must be less than equal to 1 % of that length. For line segments longer than 200 mm maximum deviation must be less than 2.0 mm.

For line segments longer than 100 mm the maximum allowed deviation is 1.0 mm.

6.4. Linearity

- Definition: Linearity is defined as a relative change in character dimensions.
- Measurement: 16 x 12 Cross-hatch test pattern. Brightness control is set so that the background raster has just extinguished and the contrast control is set to maximum.
- Requirements: For horizontal sync frequencies above 48 kHz
The limits for vertical or horizontal non-linearity are 5 % between adjacent squares and 10 % between any squares.

For horizontal sync frequencies below 48 kHz

The limits for vertical or horizontal non-linearity are 8 % between adjacent squares and 12 % between any squares.

The method of calculating linearity is: $[(\text{max} - \text{min}) / \text{max}] \times 100$

The measurement is done via the centre point of the rectangle.

6.5. Phosphor Colour Coordinates

- Measurement conditions:
Test pattern is full screen R,G or B field.
Brightness control is adjusted for a background raster luminance level of cut off.
Contrast control is adjusted to the maximum luminance level.
Input signals R,G or B with maximum amplitude.
- Requirements: Phosphor CIE-coordinates

	X	Y
Red	0.625	0.333
Green	0.285	0.605
Blue	0.152	0.068

Tolerance of the colour coordinates will be < 0.020 in both X and Y direction.

6.6. Colour Temperature and Tracking

- The default colour temperature is 9300 K
- Measurement conditions:
 - Test pattern 50 x 50 mm white field at the screen centre.
 - Brightness control adjusted for a background raster luminance of 1 cdm^{-2} .
 - Input signals R,G and B with maximum amplitude.
- Requirements: When contrast control is adjusted from a luminance level of 100 cdm^{-2} to 17 cdm^{-2} the 1931 CIE X and Y coordinates measured at the screen centre do not vary more than
 - $X \pm 0.020$
 - $Y \pm 0.020$

6.7. Colour Purity

- Measurement conditions:
 - Test pattern full screen R,G and B field.
 - Brightness control adjusted for a background raster luminance level 1 cdm^{-2} .
 - Input signals R,G and B maximum amplitude.
 - After rotating the unit must be degaussed.
 - Viewing distance 600 mm, for 5 second observation.
- Requirements: Colour purity is visually checked for each full raster primary colour. Tube facing east, west, north and south each primary colour raster shall have no colour impurity due to beam mislanding. For a full white field, if there is an area of observed impurity in colour, the difference in colour coordinates between that area and the center of the display area shall be less than x: ± 0.015 ;
y: ± 0.015 In addition, the square root of the sum of the squares of the differences in x and y must be less than or equal to 0.015.

6.8. Luminance

- Definition: The following methodology and definition of luminance shall be applicable throughout this specification.
Luminance shall be measured on 1280 x 1024 75 Hz pixel format at five areas, using two different pictures:
 - 1) In the center of the screen white field 50 x 50 mm.
 - 2) Full white field.
The five areas are defined as:
 - L0 Center of the screen
 - L1 Upper left of the screen
 - L2 Upper right of the screen
 - L3 Lower left of the screen
 - L4 Lower right of the screen
- Requirements: Maximum Contrast Luminance
With the 1.0 cdm^{-2} brightness and the contrast control set to maximum measure the maximum luminance at the centre of the picture.
Full white field: luminance $\geq 100 \text{ cdm}^{-2}$
50 mm x 50 mm white field luminance $150 \pm 30 \text{ cdm}^{-2}$

Minimum Contrast Luminance
With the 1.0 cdm^{-2} brightness and the contrast control set to minimum measure the maximum luminance at the centre of the picture
50 x 50 mm white field $1 \text{ cdm}^{-2} \leq (L0) \leq 10 \text{ cdm}^{-2}$.

Luminance uniformity

With full white field and with the brightness control set so that the background raster is just extinguished the contrast control set for a luminance of 100 cdm^{-2} at the centre of the screen measure the luminance uniformity. The luminance at anywhere in the display area must be more than 75% of the luminance at the centre. This uniformity specification must be fulfilled the tube facing east, west, north and south.

Maximum Background Luminance

The luminance of the background, measured at centre of the screen, without active video and in the absence of significant ambient illumination, illumination at the maximum must be

$$1 \text{ cdm}^{-2} \leq L_0 \leq 7 \text{ cdm}^{-2}$$

6.9. Convergence

- Definition: Misconvergence is defined as the distance between centres of the red, green and blue beams at the screen using rectangular coordinates. The centre is defined as the midpoint of the brightest portion of the beams.
- Measurements: Using a crosshatch test pattern adjust each gun to produce white dim lines. Adjust brightness control so that background will just disappear. Set contrast control to give a luminance level of 50 cdm^{-2} on white 50 mm x 50 mm square at the screen centre
- Requirements: For horizontal sync frequencies above 48 kHz:
Inside a circle with a diameter equal to the height of the active screen $\leq 0.30 \text{ mm}$. Elsewhere inside the active screen area ≤ 0.40 .

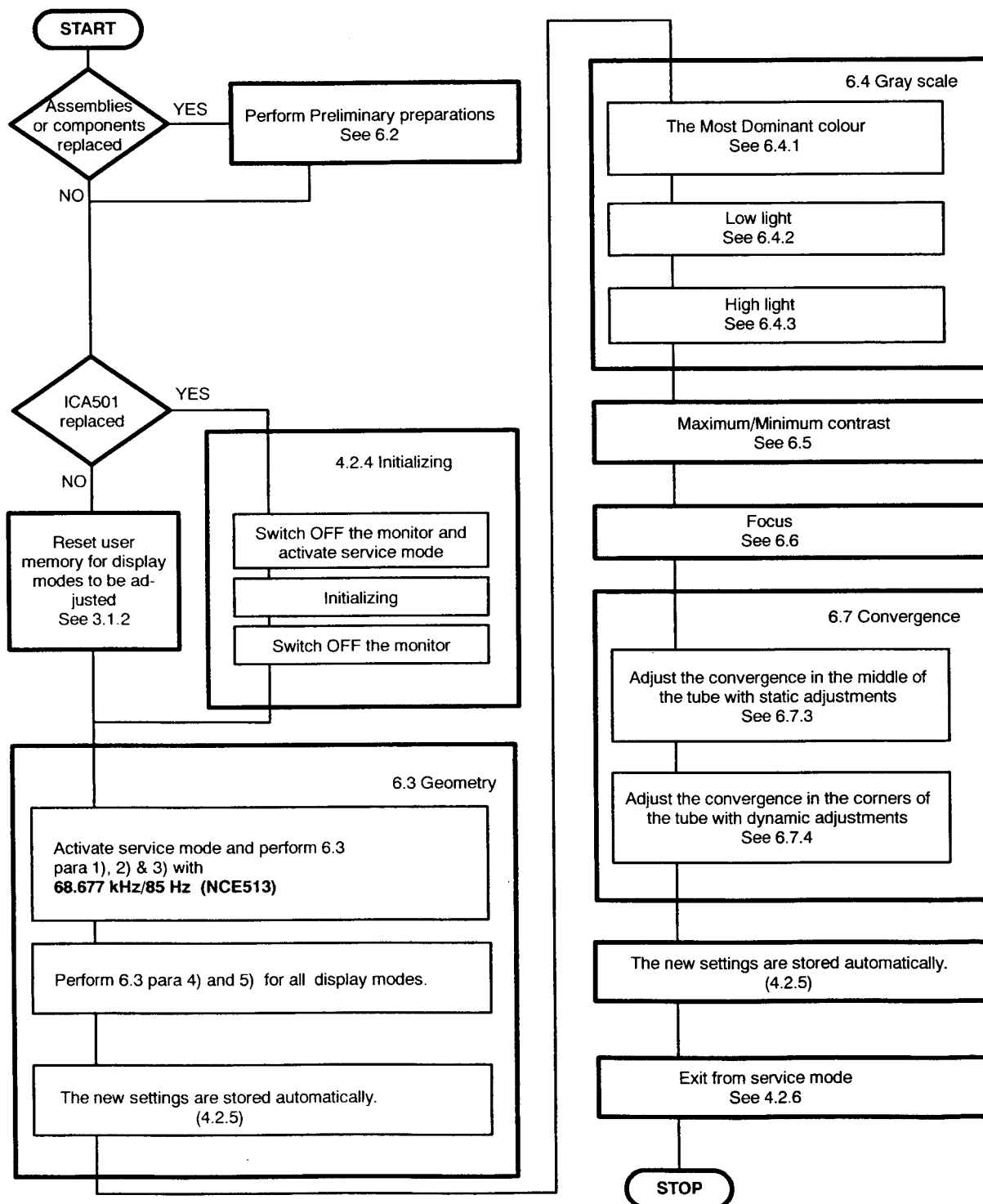
For horizontal sync frequencies below 48 kHz:
Inside a circle with a diameter equal to the height of the active screen $\leq 0.40 \text{ mm}$. Elsewhere inside the active screen area ≤ 0.50 .

7. Adjustment Procedure

The following procedure must be carried out in case of large service operations e.g. when a circuit board or nonvolatile memory ICA202 has been replaced by a new one.

The order of adjustments explained here has been found to produce the desired result with the minimum of effort. Adjustments can also be made in another order or completely separately.

7.1. Adjustment Flow Diagram

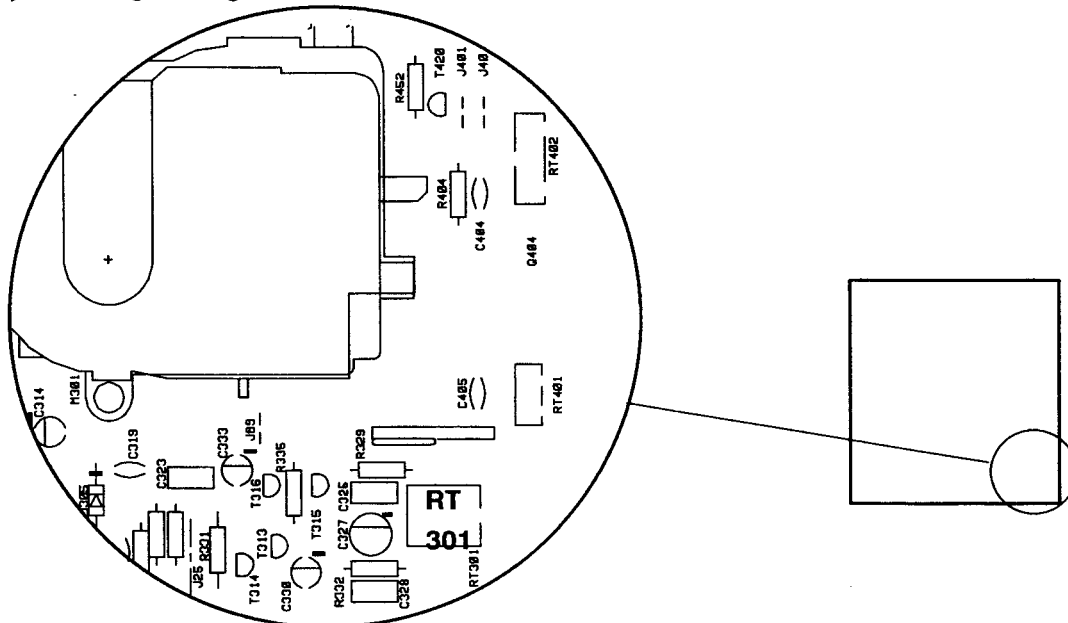


7.2. Preliminary Preparations

Connect the signal cable to the PC. Switch on the monitor and the PC. Let the monitor warm up for 20 minutes before starting the adjustments.

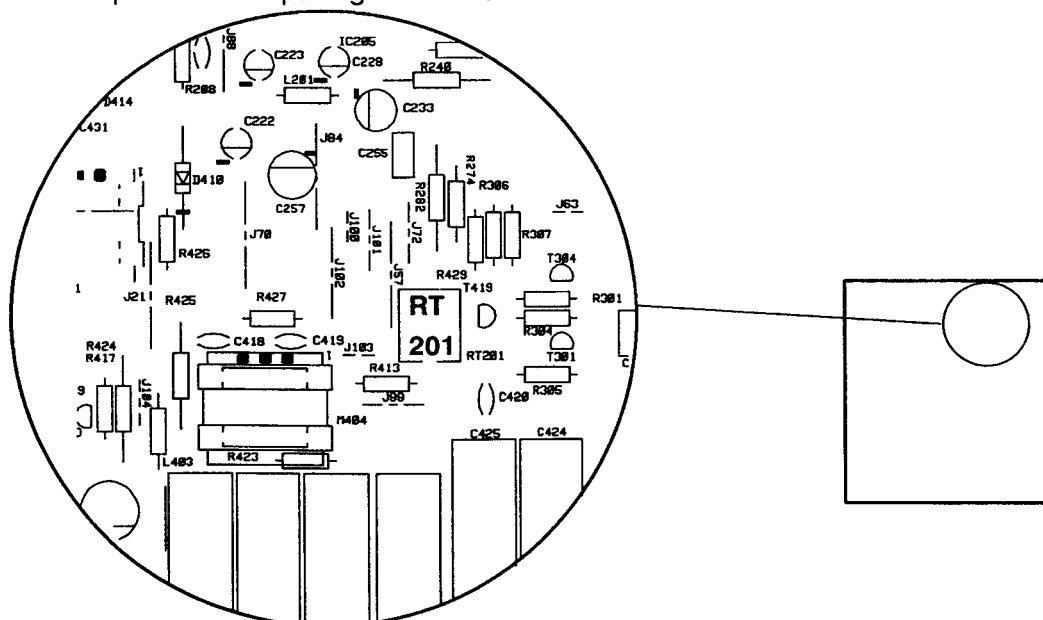
7.2.1. High Voltage

- Select 31.47kHz/60Hz (NCE300) crosshatch test pattern.
- Connect the high voltage meter to the anode of the picture tube.
- Adjust the high voltage to **26.0 ±0.3 kV** with **RT301** on SMA-board.



7.2.2. Coarse width

- 1) Select 68.677 kHz/85 Hz (NCE513) crosshatch test pattern.
- 2) Set width to the 80 % with menu adjustment..
- 3) Set width equal to bezel opening with **RT201**.



7.2.3. Preliminary Picture Adjustments

- 1) Select 68.677 kHz/85 Hz (NCE513) crosshatch test pattern.
- 2) Set **1** to maximum and adjust ***** to 70 % (faintly visible).
- 3) Adjust focus if poor.

Remember

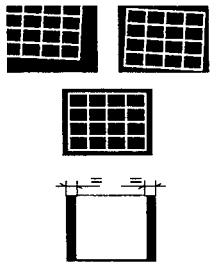
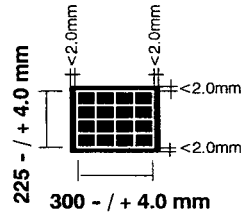
- Do not adjust **G2**-voltage with potentiometer or menu if you have reason to believe that there is no need to adjust gray scale.

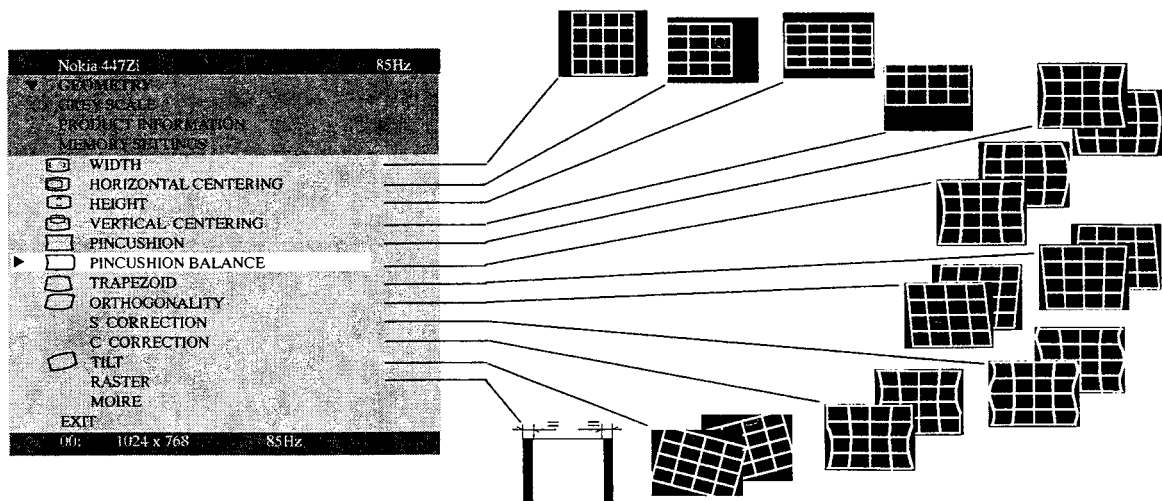
7.3. Geometry

Magnetic fields for following adjustments: vertical 0.45G and horizontal 0.0G.

Activate Service Mode in 68.677 kHz/85Hz (NCE513).

Degaussing must be carried out before the picture adjustments. Degaussing shall be repeated if the monitor is moved.

1) Select 68.677 kHz/85 Hz (NCE513) crosshatch test pattern. Set 1 to maximum and adjust * until the background is faintly visible. Reduce width until both vertical edges of the background are visible. 2) Straighten the picture if tilted. This adjustment is common for all display modes. 3) Centre the background. This adjustment is common for all display modes.	
4) Adjust size, position and shape of the picture equal to the mask aperture. Adjust first the properties with largest deviation from the correct value. 5) Adjust final width and height. 6) The distance between bezel and active screen edge shall not vary more than 2.0 mm in vertical and horizontal direction.	
7) Repeat steps 4) and 5) for every display mode to be stored. Note that the display mode can be changed without leaving the service mode.	



7.4. Grey Scale

The grey scale is adjusted for 9300K colour temperature.
Activate Service Mode in 68.677 kHz/85Hz (NCE513).

7.4.1. The Most Dominant Colour

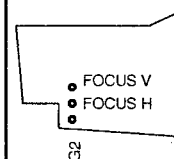
The most dominant colour has been marked in a label on the deflection yoke. It may not be correct if tube or SMH card has been changed. In that case judge the most dominant colour from the tone of the picture after you have made the following adjustments.

- 1) Select **68.677 kHz/85 Hz** (NCE513) black test pattern.
- 2) Set * to maximum and ● to minimum.
- 3) Set Blacklevel adjustment **RED/GREEN/BLUE Black Level** to 12% of the maximum.
- 4) Set **RED/GREEN/BLUE Amp** menu and **G2 menu** adjustments to center (50%).
- 6) Place the probe of the colour analyzer in the middle of the screen and adjust with **G2 trimmer** until the picture illuminance is $4 \pm 0.5 \text{ cdm}^{-2}$.



7.4.2. Low Light

- 1) Select **68.677 kHz/85 Hz** (NCE513) black test pattern.
- 2) Adjust picture illuminance to 1.0 cdm^{-2} with * potentiometer.
- 3) Adjust the ● with potentiometer to the minimum.
- 4) Adjust the colour coordinates to (9300K)
 $x = 0.281 \pm 0.020$
 $y = 0.311 \pm 0.020$
 with **RED/GREEN/BLUE Black Level** adjustments.
Do not adjust the most dominant colour.
 During the adjustment check if brightness is chancing over tolerance, when needed adjust it back. If Y- and X-values are getting too far from ideal values it's better to adjust both colours back to 10 %. If any colour during adjustments is going under 10 %, you have chosen wrong **MOST DOMINANT COLOUR**. Check the dominant colour again according to the instructions.
- 5) Set * to the maximum and check that the illuminance is still $4 \pm 0.5 \text{ cdm}^{-2}$. If not, repeat 7.4.1. steps 5) and 6).
- 6) Adjust picture illuminance to 1.0 cdm^{-2} with * potentiometer and check the colour coordinates.



Left side view of the chassis

7.4.3. High Light

- 1) Select **68.677 kHz/85 Hz** (NCE513) black test pattern.
- 2) Adjust with * the picture illuminance to $1 \pm 0.5 \text{ cdm}^{-2}$.
- 3) Select **68.677 kHz/85 Hz** (NCE513) window test pattern.
- 4) Adjust with ● the picture illuminance in the window to $100 \pm 5 \text{ cdm}^{-2}$.
- 5) Adjust with **RED/BLUE Amp** the colour coordinates in the window to
 $x = 0.281 \pm 0.020$
 $y = 0.311 \pm 0.020$
 Check after adjustment that the illuminance reading is in limits.



7.5. Maximum/Minimum Contrast

- 1) Set ● to the maximum.
- 2) Adjust with * the picture illuminance outside window to 1.0 cdm^{-2} .
- 3) Adjust illuminance in the window to $150 \pm 20 \text{ cdm}^{-2}$ with **MIN/MAX CONTRAST**.
- 4) Set ● to the minimum.
- 5) Adjust the minimum illuminance in the window to $4 \pm 3 \text{ cdm}^{-2}$ with **MIN/MAX CONTRAST**.
- 6) Exit from service mode.



7.6. Focus

- 1) Select **68.677 kHz/85 Hz** (NCE513) crosshatch test pattern
- 2) Set ● to the maximum and adjust * to 70 % (background faintly visible).
- 3) Adjust the sharpness with **FOCUS H** and **FOCUS V** to optimum
- 4) Adjust * until the background is invisible
- 5) Select focus test pattern. Check that all letters are clearly visible.



7.7. Convergence

Reduce first the convergence error in the middle of the screen to minimum using static adjustments. After the convergence is faultless in the middle of the tube, use dynamic adjustments to eliminate the error in the edges of the tube.

Static adjustments affects the whole picture area:

- Magnet ring set on the tube neck (horizontal + vertical)

Dynamic adjustments affects a part of the picture area:

- Deflection yoke trimmers.

7.7.1. Measuring Conditions

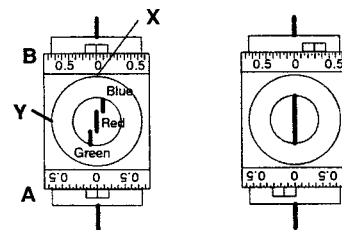
- Adjust convergence with 68.677 kHz (NCE513) line frequency.
- Make sure that focus is correctly set at the mid-point between the screen center and the edge of the picture.
- Use white crosshatch test pattern with circle.
- Adjust ● to near the maximum and reduce ✱ until the background disappears.

7.7.2. Convergence Measuring Gauge CM7AR

The use of the Klein CM7AR Convergence Gauge has been explained here but other types of gauges can be used as well.

Check that the adjusting knobs (A & B) are set to zero.

- Place the gauge on the line with marking **Y** up upwards when measuring horizontal line.
- Place the gauge on the line with marking **X** up upwards when measuring vertical line.
- If the line has convergence error, the line in the window seems to be broken.
- Use knobs A and B to adjust the line continuous.
- If the readings are on the opposite side of zero, the convergence error is A+B (e.g. 0.2 + 0.1 = 0.3).
- If the readings are on the same side of zero, the convergence error is equal to A if A > B or B if B > A

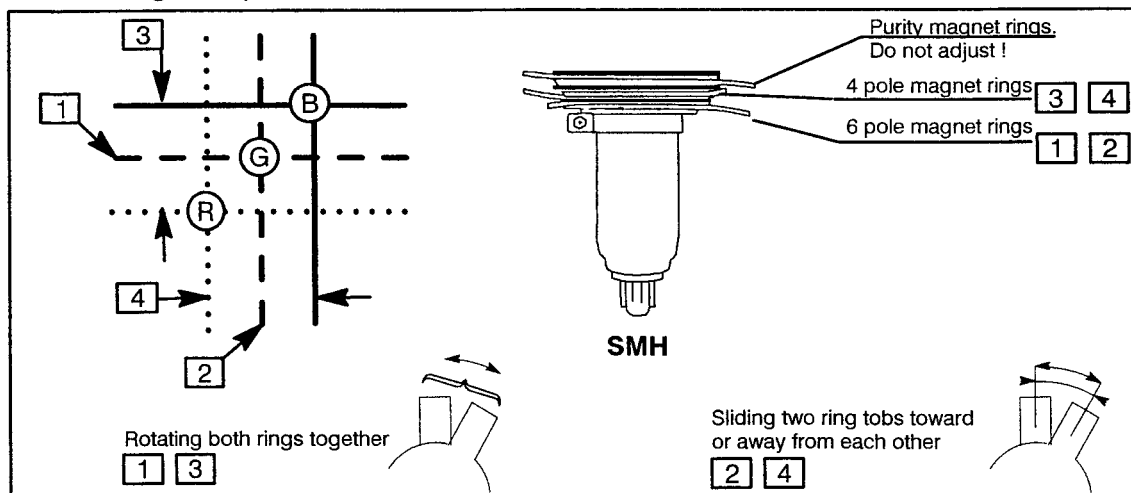


7.7.3. Static Convergence

The magnet rings has been set to the optimum in the factory. Readjustment is necessary only in case the adjusting magnets have been accidentally moved.

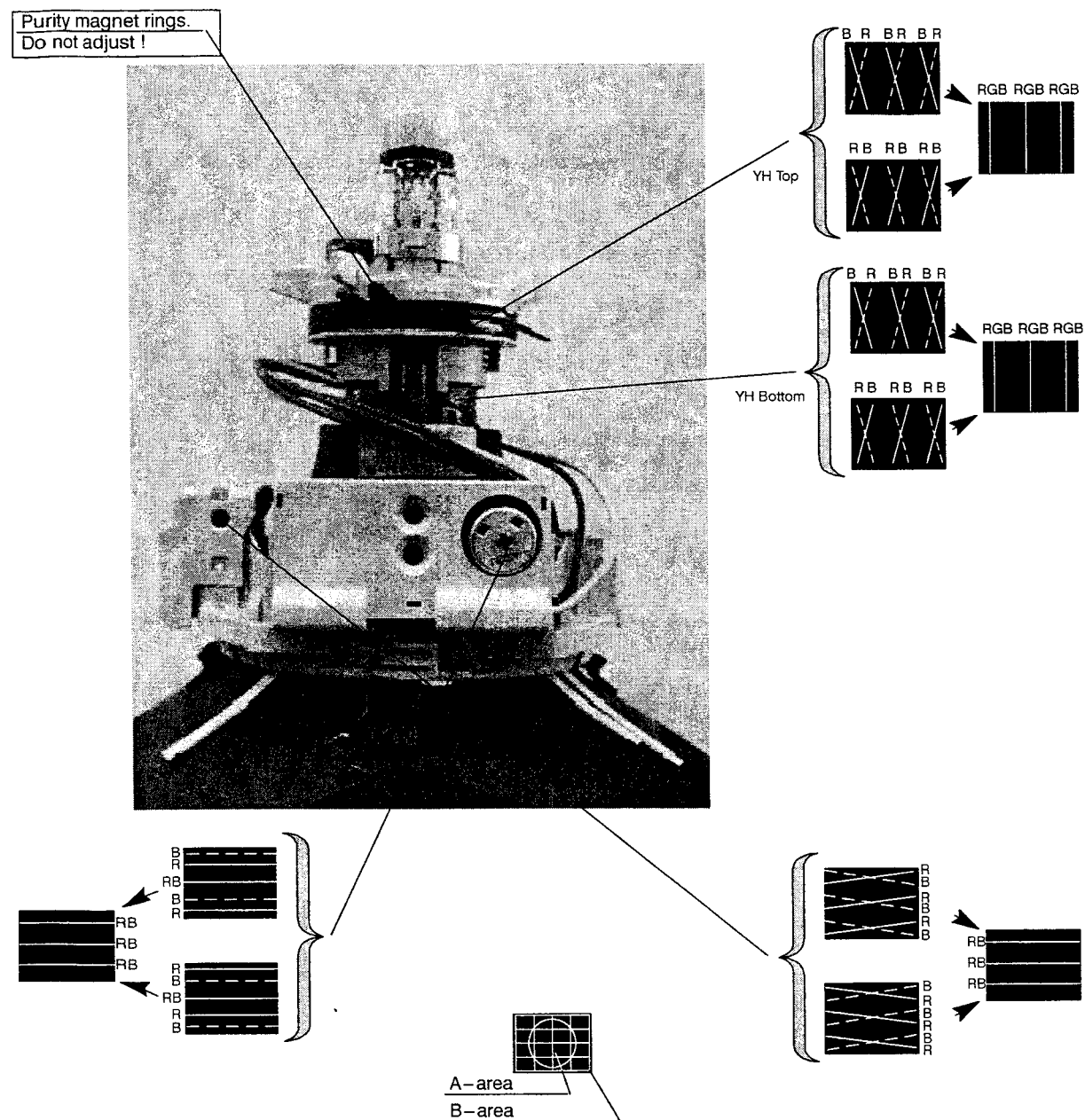
- 1 Adjust G vertically in the middle between R and B with 6 pole magnet rings.
- 2 Adjust G horizontally in the middle between R and B with 6 pole magnet rings.
- 3 Adjust R and B vertically to the same position with G line with 4 pole magnet rings.
- 4 Adjust R and B horizontally to the same position with G line with 4 pole magnet rings.

Lock the rings with paint.



7.7.4. Dynamic Convergence

Deflection yoke trimmers



7.7.5. Allowed Error Levels for Convergence

Area A $\leq$ 0.30 mm

Area B $\leq$ 0.40 mm

7.8. Colour Purity

Do not move purity magnet rings. If the purity magnet rings are found to have moved during transportation or handling, set them just in the original position by tracing the locking paint put on purity magnet rings and holder of beam bender and then readjust the static convergence.

8.Screen and Faceplate Blemishes

8.1. Test Procedure

- 1) Tests are to be done under the following conditions:
 - a) The viewing angle relative to the tube axis should not exceed 45°
 - b) For an unactive screen the diffuse ambient light level at the centre of the screen should be between 700 and 1000 lux.
 - c) The light output on a blanked raster at the center of the screen should be approximately 17 cd/m² and color temperature CIE x= 0.281, Y= 0.311 (9300). Ambient light level at the tube face should be approximately 1.0 lux.
- 2) Viewing distance should be 60 cm minimum.
Faults not visible at this viewing distance are permitted.
- 3) The following quality areas are specified:

Area A:
Rectangular area (sides X and Y) measuring 300 mm x 225 mm of which the point of intersection of the diagonals coincides with the mechanical centre of the screen.

Area B:
The area between Area A and the edge of the phosphor.
- 4) Remarks concerning faults:
Unless otherwise specified, the shape of a blemish is defined as : round and elliptical.
The size of a blemish is given by:

$$\frac{L + W}{2} \text{ or } \frac{L}{20} + 2W, \text{ L=length and W=width}$$

8.2. Classification of Screen and Faceplate Blemishes

Blemishes are divided into phosphor screen blemishes and glass bulb blemishes

8.2.1. Phosphor Screen Blemishes

Blemishes are classified depending upon table A and judged with the standard specified in table C

Table A Contents of blemish

Category	Contents of Blemish
Entire defects	- Black Spot - 50% or more of complete dot is missing
Partial defects	- 25 to 49% of complete dot is missing
Other defects	- Non – uniformity lighted Part - Sumdage and so on

Table B Quality area

Tube size	Rectangle area concentric with the center of screen
Ø 41 cm	315 mm X 235 mm

Table C Limits of phosphor screen blemishes

Entire defects and partial defects

Size in missing phosphor dots	Max. number in area			Min. acceptable distance between any 2 blemishes in area (mm)		
	Area A	Area B	Area A+B	Area A	Area B	Area A+B
50% or more of the complete dot is missing						
1 Trio	2	3	3	50	20	20
3 adjacent same color dots	0	0	0	—	—	—
2 adjacent same color dots	1	2	2	50	20	20
2 adjacent different color dots	2	3	3	50	20	20
1 dot - green	4	3				
- red	6	5	13	50	20	20
- blue	6	5				
Partial missing phosphor dot: 25% to 49% of the complete dot missing	—	—	—	50	20	20
Total number of blemishes	7	7	7	50	20	20

Other defects:

Equivalent diameter of the total area should be less than 13 mm in Area A and 50 mm in Area A+B.

8.2.2. Limits of Faceplate Blemishes

Scratches

Table A Maximum size of scratches allowable:

Width W (mm)	Length (mm) of Single Scratch	Allowable number
$W < 0.05$	No Limit	—
$0.06 \leq W < 0.12$	50 or less	1
$0.13 \leq W < 0.20$	13 or less	1
$0.20 \leq W$	None Allowed	0

Table B Limits of faceplate defects

			Area A	Area B
Permissible Major Defects	Blister (mm)		0.51 – 0.70	0.51 – 0.70
	Spot & Open Blister Ave.dia (mm)		0.41 – 0.60	0.41 – 0.60
	Maximum Permissible number	Each Zone	2	3
		Total	4	
	Allowable Minimum Separation (mm)		50	
Permissible defects within $\varnothing 50$ mm	Blister (mm)		0.25 – 0.70	
	Spot & Open Blister Ave.dia (mm)		0.20 – 0.60	
	Max. permissible number		6	
	Allowable Minimum Separation (mm)		12.7	
Elongated	Width (mm)		0.10 – 0.20	0.10 – 0.30
	Maximum Length (mm)		4.0 mm	6.0 mm
	Allowable number of defects Total		4	

8.2.3. Limits of Coating Defects

Coating defects are classified depending upon the next table and judged with the standard specified in table B

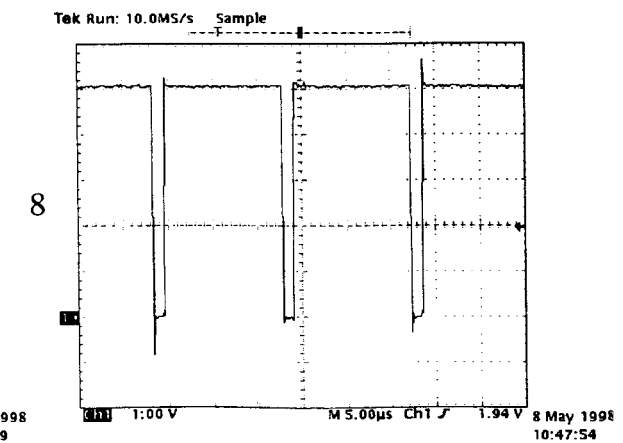
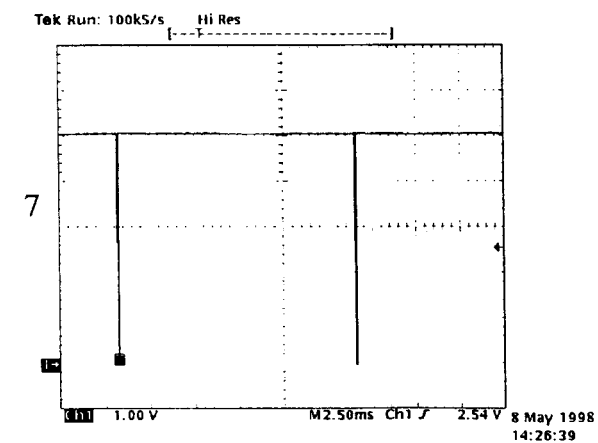
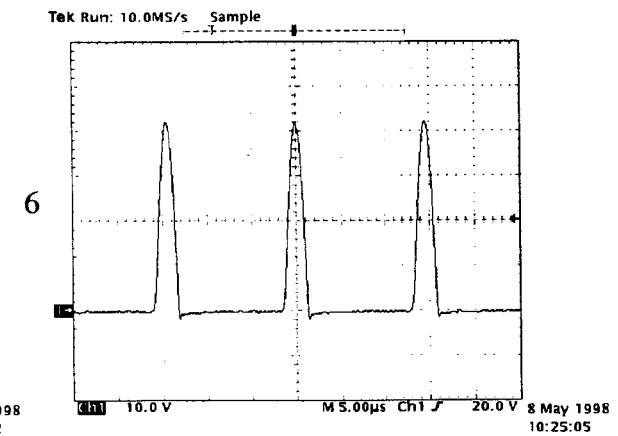
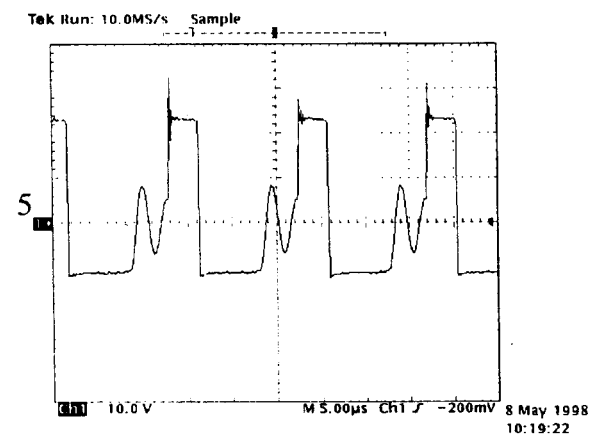
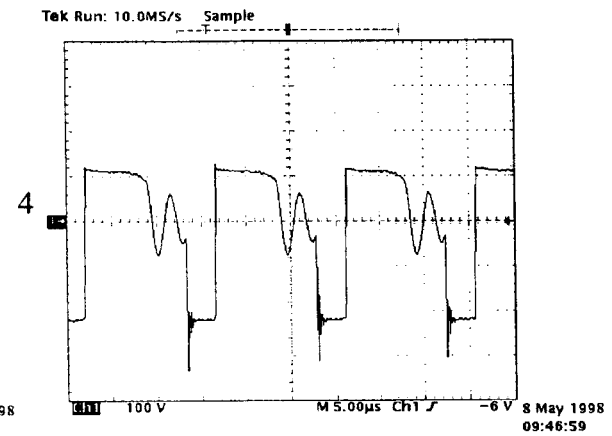
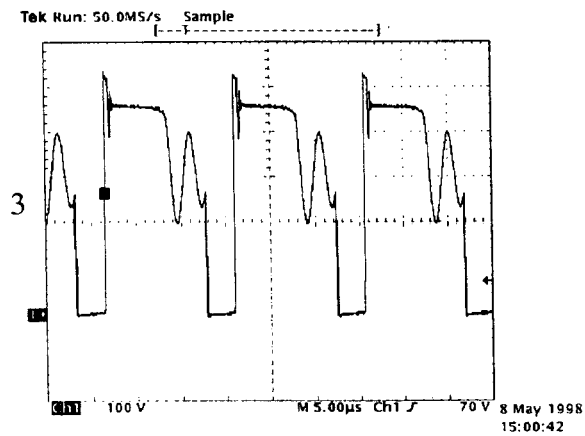
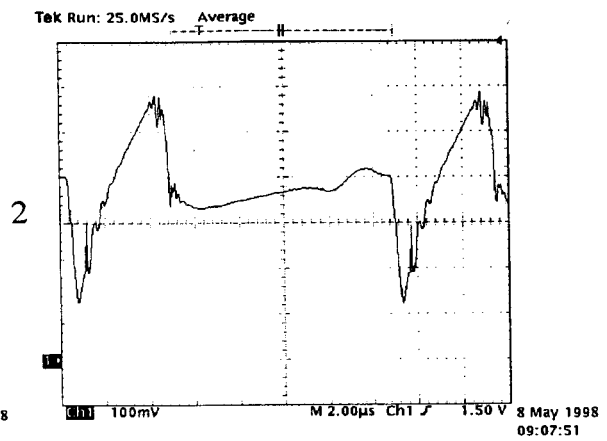
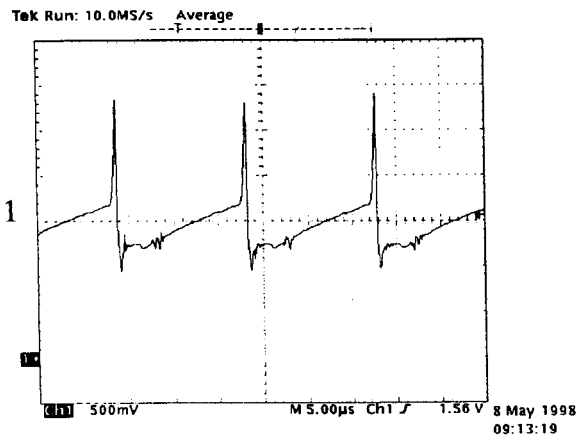
Table A Definition of coating defects

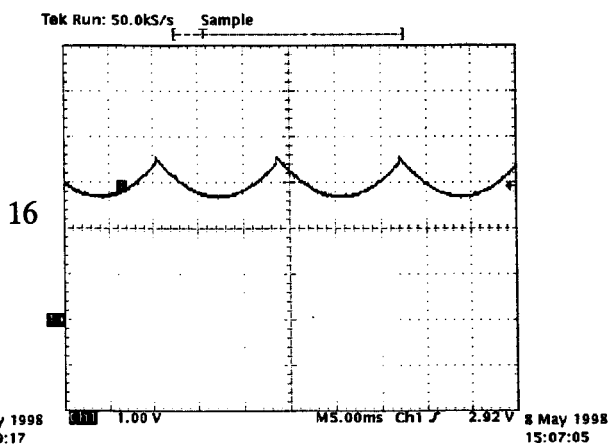
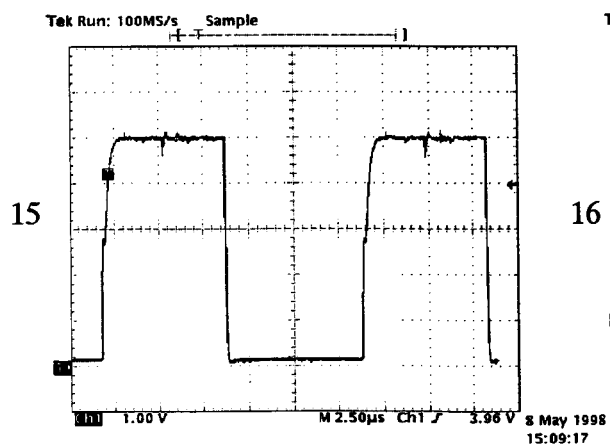
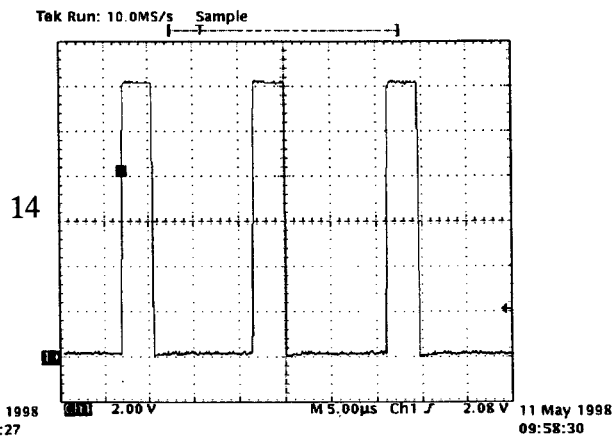
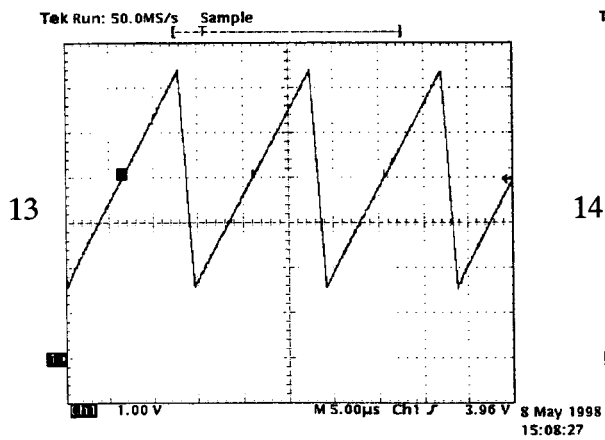
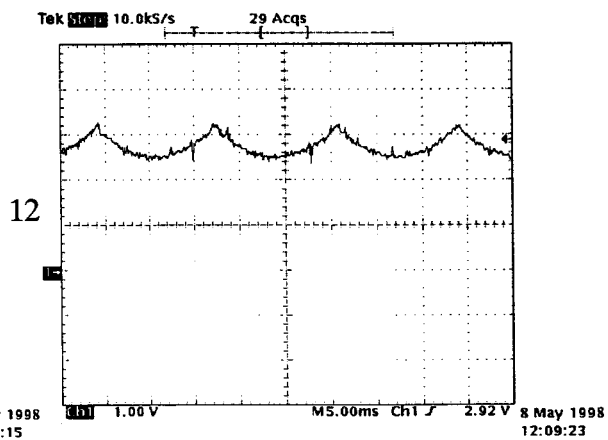
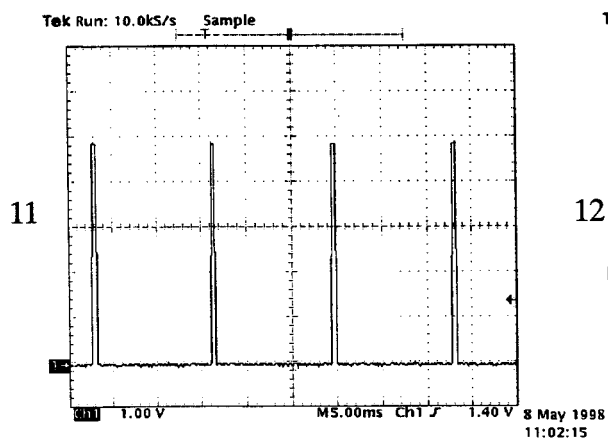
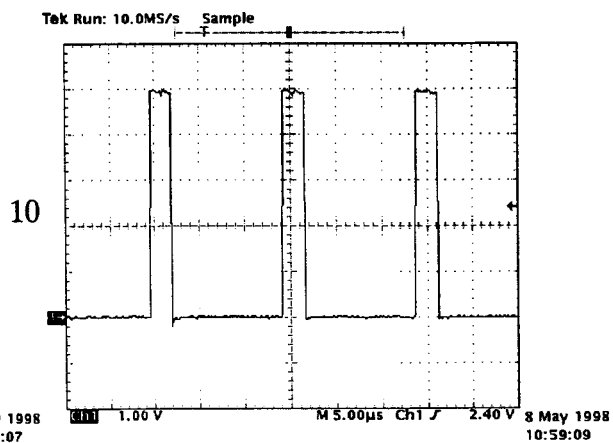
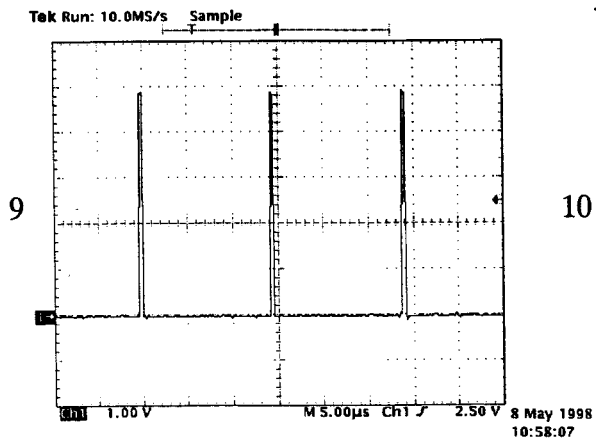
Rings of defects	Content of defects	Valuation of defects
High-contrast	- Reflective spots and coating voids - Clearly visible by reflection	The number of defects and quality area
Low contrast	- Cloudy visible by reflection	The number of defects and quality area
Elongated	- Same reflective as low contrast - Not include high contrast reflectance	The number of defects and quality area

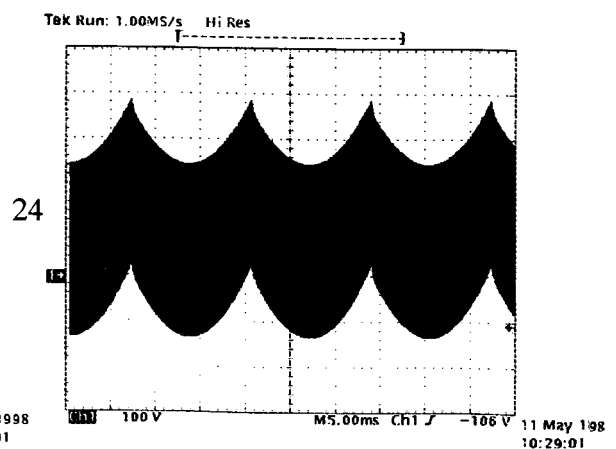
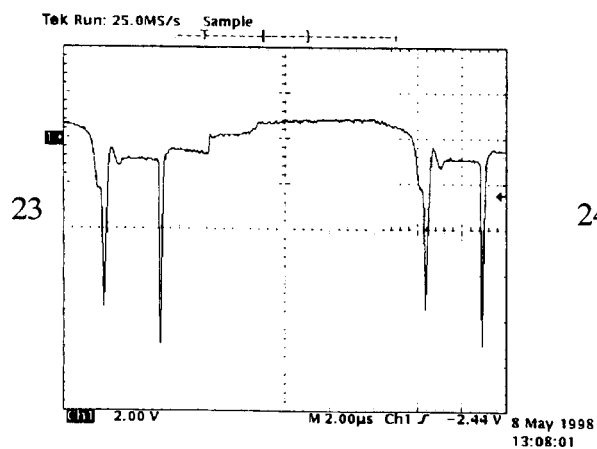
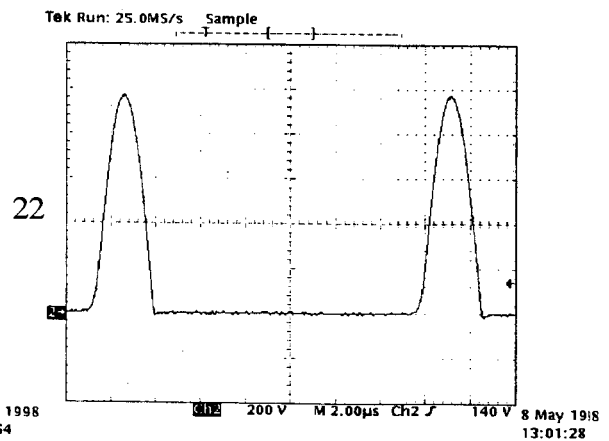
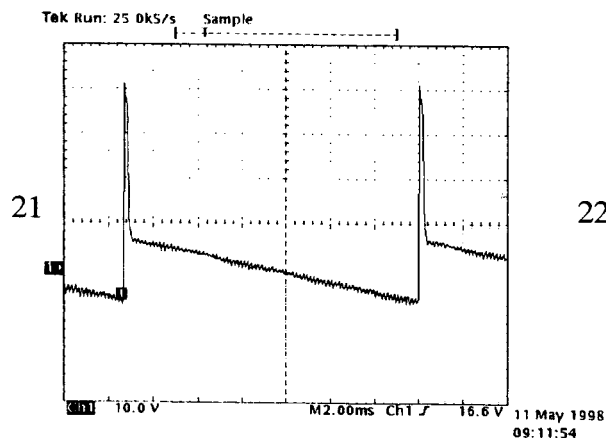
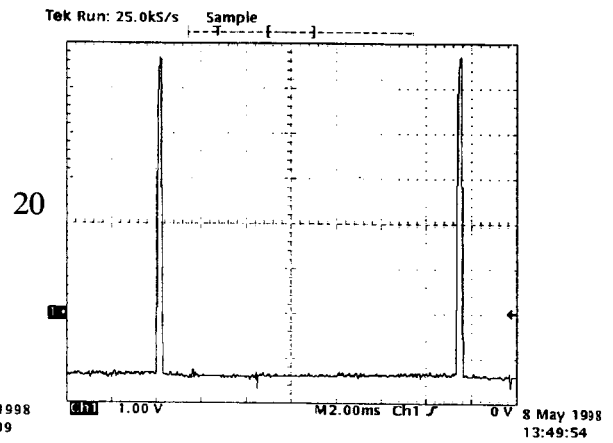
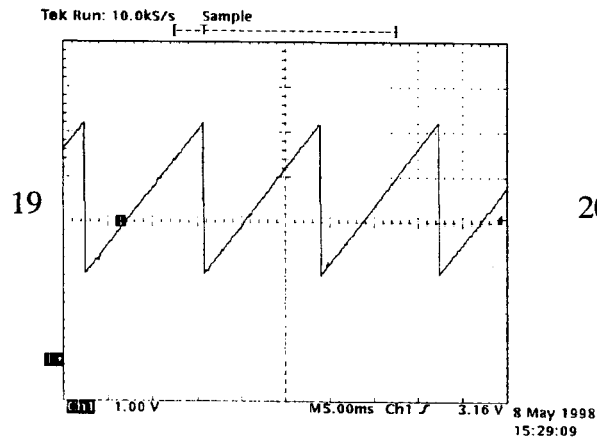
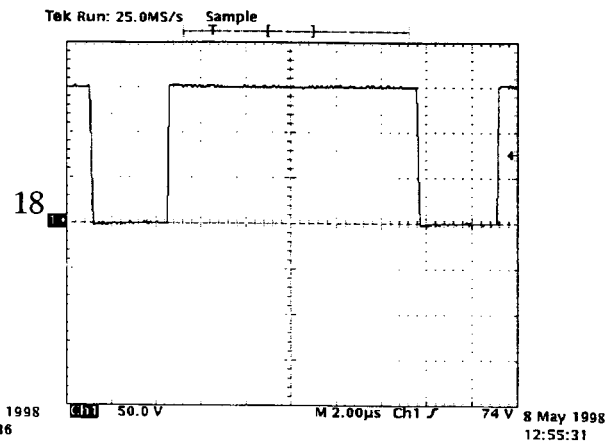
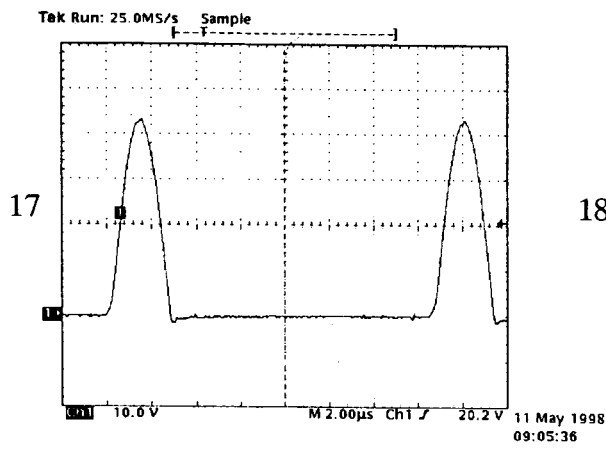
Table B Criteria

The following criteria is applied to defects of useful screen area.

Kinds of defect		Area A 315 mm X 235 mm				Remainder of Useful Screen			
High-contrast	Size of defects (mm)	0.5 or less	0.5 – 1.0	1.1 – 1.5	over 1.5	0.5 or less	0.5 – 1.0	1.1 – 1.5	over 1.5
	Allowable number of defects	ignore	5	3	0	Ignore	5	3	1
	Allowable minimum separation (mm)	30				30			
Low-contrast	Size of defects (mm)	1.5 or less	1.6 – 3.0		over 3.0	1.5 or less	1.6 – 3.0		over 3.0
	Allowable number of defects	ignore	3		0	ignore	3		0
	Allowable minimum separation (mm)	20				20			
Elongated	Width	5.0 or less				ignore			
	Maximum length	10 or less		over 10					
	Allowable number of defect	3		0					

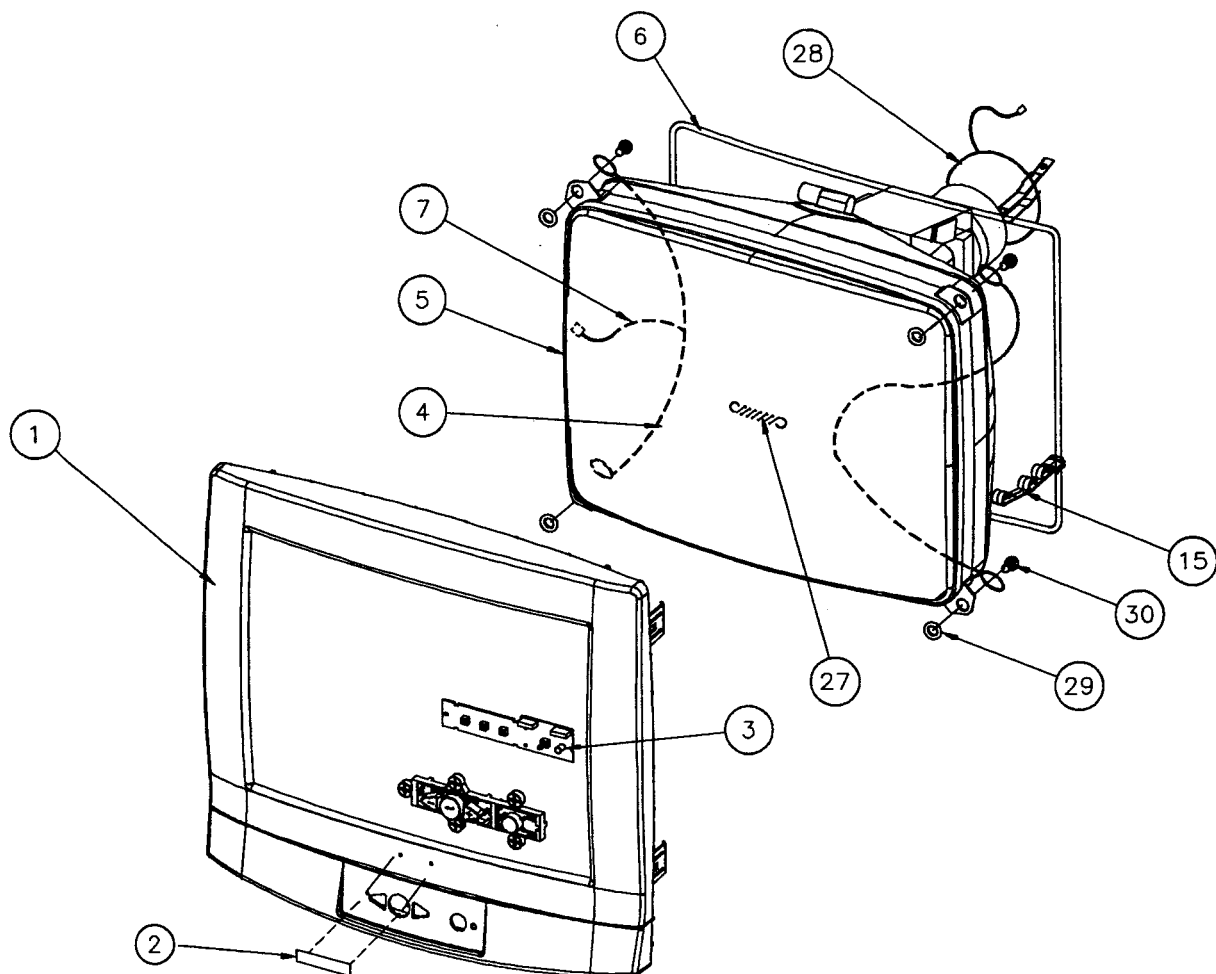




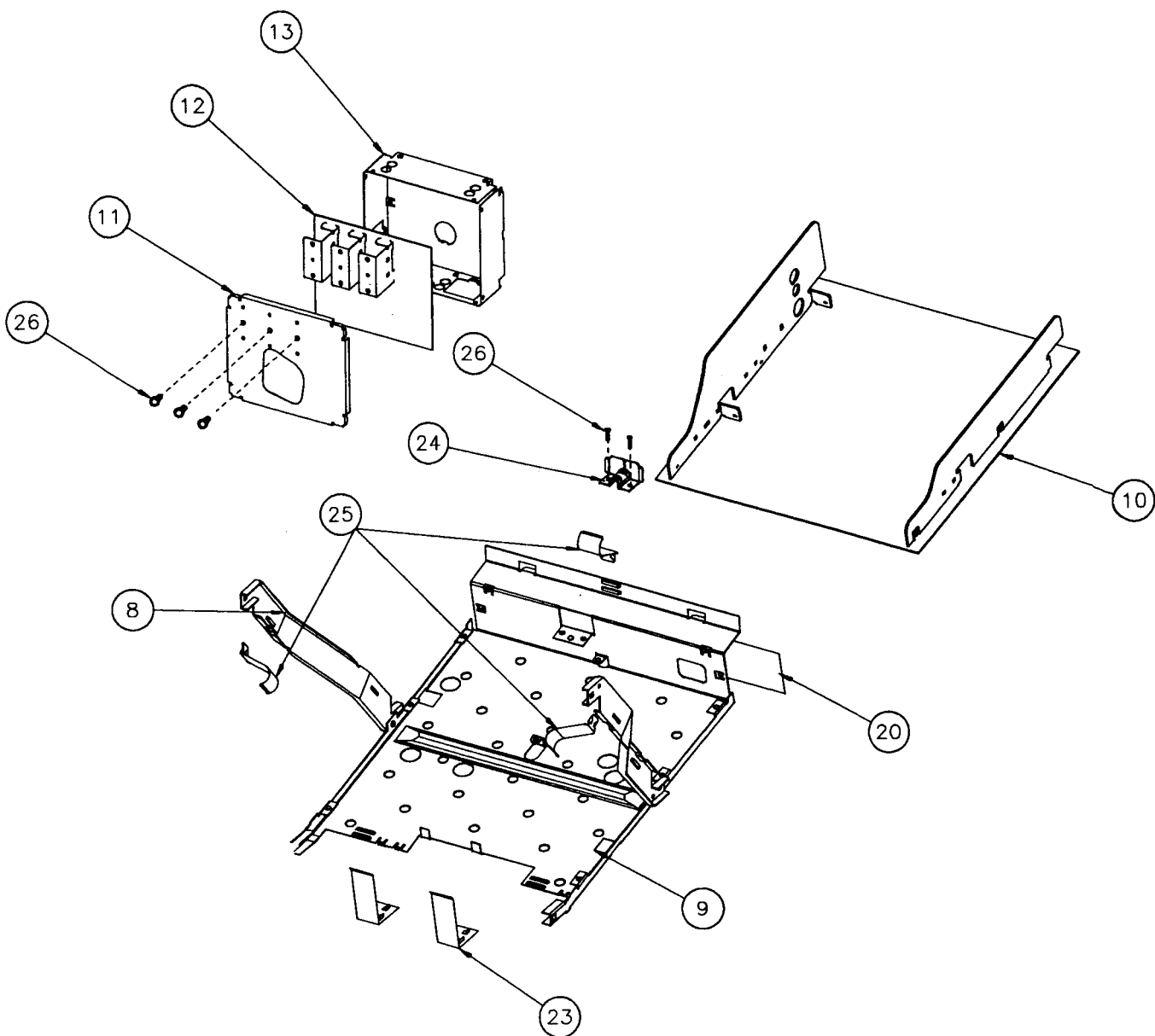


Spare Parts

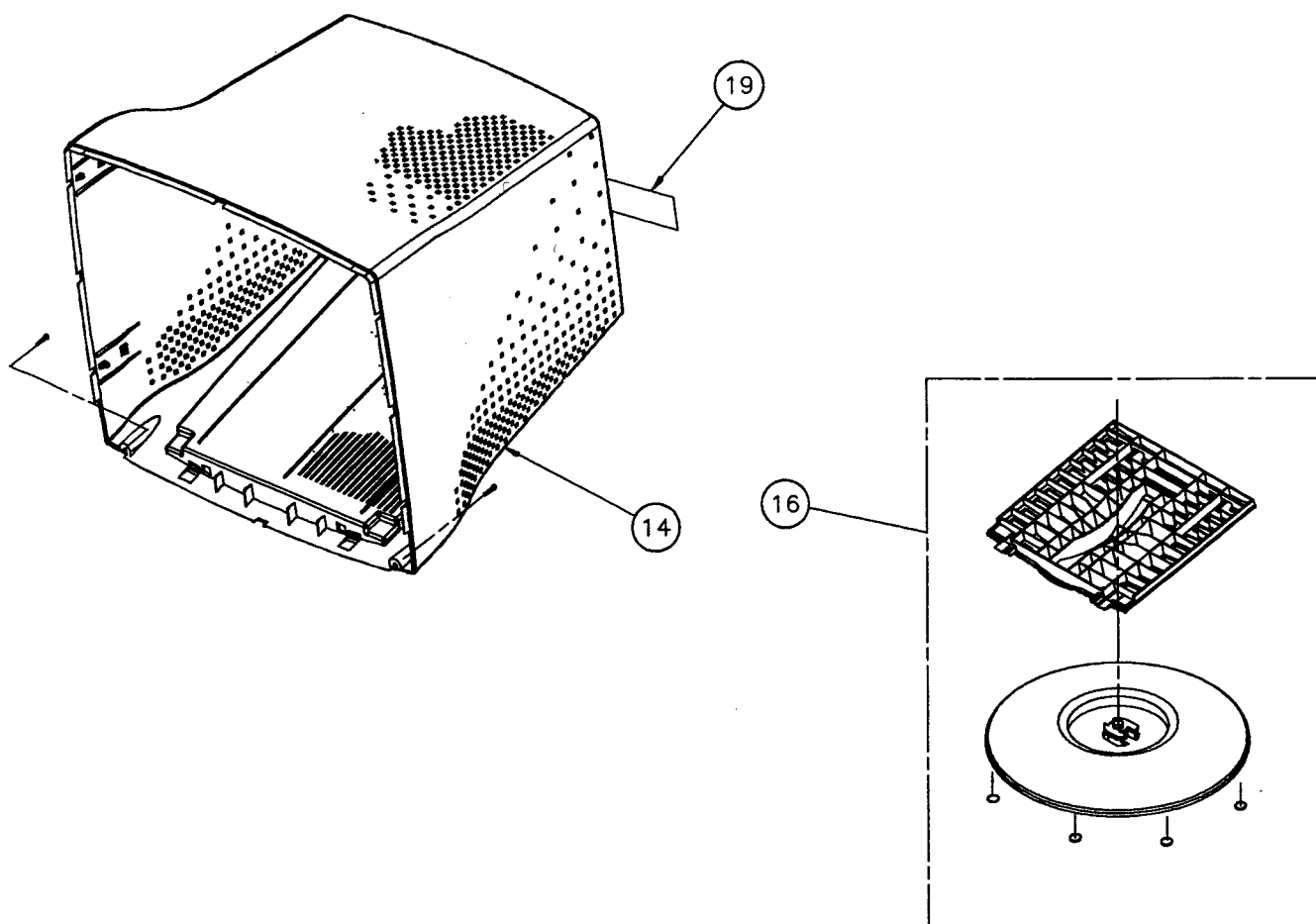
P/N	Description	Emission	Prod P/N
447Zi	17" Nokia FST EU	TCO	447I051
447Zi	17" Nokia FST USA	TCO	447I059



Part Number	Description	PG	Item Number	Model
1	Front cover assembly (SE2686+UT1868)	23	UM7911A	
2	Badge-Nokia (38mm)	06	UA1244	
3	Control module (Including in SMA)	*		
4	Grounding wire	05	SE2692	
5	Picture tube Philips 17"/90 M41EHN323x140/3f04	62	NM1042	
6	Degaussing coil	19	FD0178	
7	Grounding wire	04	SE2756	
15	Demagn. coil holder	02	UG0786	
27	Groundig spring for tube	04	UC3016	
28	Tilt coil	11	FD0101	
29	Friction plate	01	UL0131	
30	Pt-Screw K50x20	02	WC0448	



Part Number	Description	PG	Item Number	Model
8	Side support	20	UC7039	
9	Bottom plate	35	UC7035	
10	Main board	53	SMA222	
11	Cover shield	20	UC7034	
12	Video board	40	SMH154	
13	Shield for Video board	23	UC7033	
20	Connector label	08	ZZ2842	
23	Grounding spring lower	03	UC6885	
24	Strain reliefer	14	UC7015	
25	Grounding spring	02	UC6946	
26	Hexagon torx 10 tapping screw 3.5x9.5 Zn	01	WC0036	



Part Number	Description	PG	Item Number	Model
14	Back cover	31	UD0654	
16	Stand assembly	20	UDX098	
19	Type label 447I HUN	16	ZZ2844	

Part Number	Description	PG	Item Number	Model
	Packing box	16	ZA2551	051
	Packing box	16	ZA2566	059
	Side cushion	18	ZA5006	
	Plasticpag	02	ZA0453	
	User guide Nokia 447Zi EN-IT	16	ZF5785	
	User guide Nokia 447Zi GE-RU	16	ZF5786	051
	Warranty card NOKIA USA CRT DALLAS	09	ZF5812	059
	TCO95 Leaflet	02	ZF5737	059
	Nokia monitor setup W95 3.5"	08	ZK0008	
	Power cord 3'18AGW L=1.8M	18	QM0049	059
	Power cord 3*1.0mm2 L=2.5M Grey	18	QM0028	051
	Bluemode Macadapter	17	QK1520	059

Part Number	Description	PG	Item Number
AA0641	CF RES 0W25 47R J 2,5-7	1	RH 101 201 301
AA0649	CF RES 0W25 100R J 2,5-7	1	RH 008 020 021 108 208 308
AA0665	CF RES 0W25 470R J 2,5-7	1	RH 011 012
AA0673	CF RES 0W25 1K0 J 2,5-7	1	RH 017
AB0595	NF RES 0W25 0R56 J 2,5-7 CF	1	RH 031
AB0803	NF RES 0W5 1R2 J 4-11 CF	1	RH 030
AC3584	CHIPRES 0W1 75R 1% 0805 2013	1	RH 100 200 300
AC4400	CHIPRES 0W1 0R0 5% 0805 2013	1	JH 801 802 803 807
AC4425	CHIPRES 0W1 10R 5% 0805 2013	1	RH 006 022 023 024 104 204 304
AC4449	CHIPRES 0W1 100R 5% 0805 2013	1	RH 001 002 003 004 007 013 014 015 016
AC4473	CHIPRES 0W1 1K0 5% 0805 2013	1	RH 018 019
AC4475	CHIPRES 0W1 1K2 5% 0805 2013	1	RH 103 203 303
AC4481	CHIPRES 0W1 2K2 5% 0805 2013	1	RH 005 009
AC4489	CHIPRES 0W1 4K7 5% 0805 2013	1	RH 028
AC4545	CHIPRES 0W1 1M0 5% 0805 2013	1	RH 032
AD0349	COMPRES 0W5 100R K 4-11	1	RH 109 209 309
AD0373	COMPRES 0W5 1K0 K 4-11	1	RH 033 035
AD0397	COMPRES 0W5 10K K 4-11	1	RH 034 039
AG3265	MF RES 0W5 46R4 F TC50 2,5-7	1	RH 027
AG3273	MF RES 0W5 56R2 F TC50 2,5-7	1	RH 036 037 038
AG3419	MF RES 0W5 1K54 F TC50 2,5-7	1	RH 102 202 302
AG3451	MF RES 0W5 3K32 F TC50 2,5-7	1	RH 107 207 307
AG3533	MF RES 0W5 21K5 F TC50 2,5-7	1	RH 105 205 305
AG3569	MF RES 0W5 51K1 F TC50 2,5-7	1	RH 106 206 306
CA0306	CERCAP Y5T 220P M 2KV Y7,5 D9	2	CH 023
CA0318	CERCAP Y5P 680P M 2KV Y7,5 D10	2	CH 025
CB0122	CERCAP NPO 1P0 C 500V Y5: D6	1	CH 103 203 303
CB3129	CHIPCERCAP NP0 15P 50V J 0805	3	CH 102 202 302
CB3133	CHIPCERCAP NP0 22P 50V J 0805	1	CH 011 012 019 020
CB3175	CHIPCERCAP NP0 1N0 50V J 0805	3	CH 010
CC0200	CERCAP Y5P 1N0 K 500V Y5: D9	1	CH 016 021
CC0204	CERCAP Y5P 1N0 K 50V Y5: D6	1	CH 014
CC3480	CHIP CERCAP X7R 10% 100N 25V 0805	2	CH 003 004 005 006 009 018 104 105
CC3480	CHIP CERCAP X7R 10% 100N 25V 0805	2	CH 204 205 304 305
CE2325	IMPCAP 6N8 J 1K6V Y15 081518	5	CH 024
CK0283	PESCAP MKT 100N K 250V Y5 070812	2	CH 106 107 206 207 306 307
CK2384	PESCAP MKT 10N K 63V Y5: 030708	2	CH 101 201 301
CN0250	ELCAP 4U7 M 35V RM5: 5*8!	1	CH 001
CN2228	ELCAP 4U7 M 200V RM5 105' 10X12,5	5	CH 022
CN2032	ELCAP 10U M 50V RM5: 105' 6X12	1	CH 008
CN2467	ELCAP 47U M 200V RM5 105' 14X27	5	CH 015
CN2642	ELCAP 470U M 16V RM5: 105' 11X21	4	CH 013
CN2712	ELCAP 1000U M 16V RM5: 105' 11X21	5	CH 002
FJ0505	CHOKE 15UH 5% TAPED AXIAL	2	LH 002 003
FJ0705	CHOKE 330UH TAPED AXIAL	2	LH 004
JF0067	DI 1N4007 1000V 1A	1	DH 005
JF0072	DI BAV21 200V 250MA 50N	1	DH 006
JF4003	DI BAV103 200V 250MA 50NS SOD-80	7	DH 103 104 203 204 303 304
JF4005	DI LL4148 75V 150MA 4N (JF4006)	1	DH 001 002 003 004 101 102 201 202 301 302
JF4005	DI LL4148 75V 150MA 4N (JF4006)	1	DH 007
JH0103	ZDI BZX85B8V2 8.2V 1.3W 2%	2	DZH 002
JH0087	ZDI BZX83C5V1 5.1V 0.5W 5%	1	DZH 001
LM0992	IC STV9427 OSD W.OUT PWM DIP16	16	ICH 002
LM1004	IC TDA4886 120MHZ RGB AMP I2C OSD	13	ICH 001
LM1300	IC TDA9511 VIDEO AMP 1-CH 447I	8	ICH 100 200 300
QA0095	CRYSTAL 8,00 MHZ HC-49/U	4	XH 001
QK0851	TAP CONN RTM 1,3/5/8.002	1	QH 004
QK1415	CRIPLET CONN FOR 2-SIDED PCB	1	
QK1489	HEADER 1X12 2.54MM 90-DEG 447I	6	QH 001
QK1603	CRT SOCKET W/DOUBLE FOCUS SNAP-IN	12	QH 003
QK1708	PICOFLEX HEADER 1X18 1,27MM	5	QH 002
QK1715	BASE PIN COPPER 2.35X0.25X13.2	2	GH 002
QT0002	SPARK GAP 1,2KV +-500V R=5,0MM	3	SGH 006
QT0052	SURGE PROTECTOR 200V R=5,0MM RAD	4	SGH 001 002 003 005
QT0217	GLIMM LAMP 65V 6*16MM	3	SGH 004
UC6791	FASTENING SPRING 447E	3	ICH 100 200 300
UC7009	COOLING PLATE 447I	15	ICH 100 200 300
UC7033	SHIELD FOR SOCKET BOARD 447I	23	
UC7034	COVER 447I	20	
WC0036	UNI6950 SCREW	1	
XW0032	DOW CORNING	9	ICH 100 200 300

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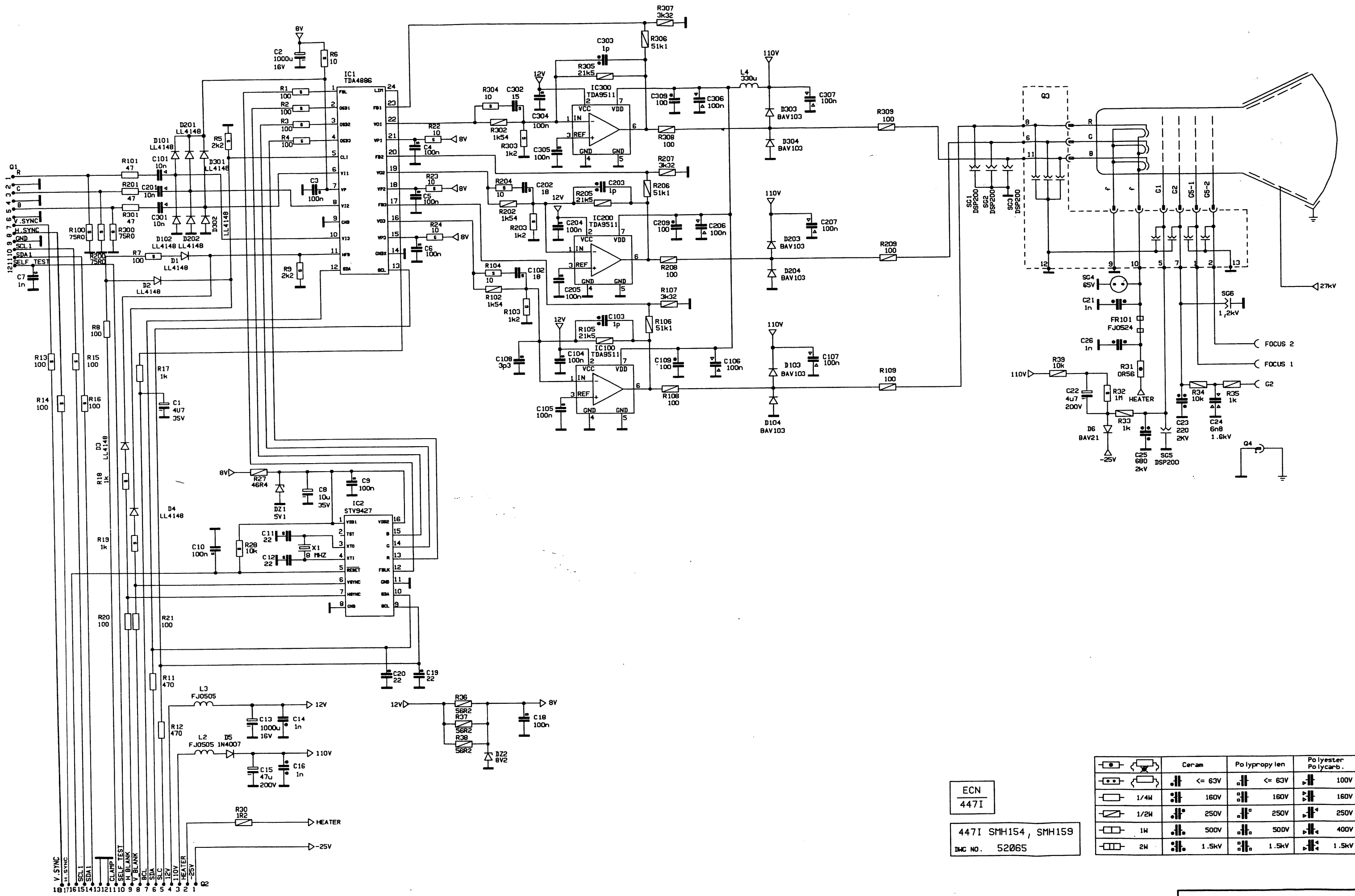
447I

Part Number	Description	PG	Item Number
FM2581	ENTERING COIL E19 / E21 447I	9	MA 401 402
FM2583	DRIVER TRAFO E19 447I	12	MA 403
FM3908	SMT ETD39 SLOT 447I	15	MA 103
FU0718	FIXED LINEARITY COIL 447Z	12	LA 401
FY6530	FERRITE CORE 17.5X9.5X28.5 L8	1	
JB0043	DIODE BY359X 1500V 5A FULLISOL	9	DA 402
JB0100	DI GBU4K BRIDGE 800V 4A	8	DA 101
JF0025	DI 1N4148 75V 200MA 4N	1	DA 305 406 105 108 211 116 117
JF0032	DI UF4007 1000V 1A 75N DO41/SOD57	4	DA 106
JF0033	DI UF5404 400V 3A 50NS DO201AD	4	DA 118 121
JF0034	DI UF5406 600V 3A 75N	9	DA 302
JF0060	DI 1N4002 100V 1A	1	DA 412 213
JF0072	DI BAV21 200V 250MA 50N	1	DA 109 119 123 413 414 122
JF0073	DI RGP10G 400V 1A 150N	4	DA 403 404 405 407 409 410 411 415 416
JF0106	DI UF2D-7000 200V 2A 50N MUOVI	3	DA 110
JF0166	DIODE BYM26C 600V 2.3A SOD-64	6	
JF0168	DIODE BYW98-200 200V 3A DO-27A !	4	DA 124 401
JF0206	SCHOTTKY RECTIFIER 30V 1A 1N5818	4	DA 107
JF4003	DI BAV103 200V 250MA 50NS SOD-80	7	DA 408 202
JF4005	DI LL4148 75V 150MA 4N (JF4006)	1	DA 102 103 104 212 210 115 208 214 207 126
JF4005	DI LL4148 75V 150MA 4N (JF4006)	1	DA 203 205 206 215 216 301 303 304
JH0054	ZDI BZX83C12 12V 0.5W 5%	1	DZA 104 301 401 402
JH0058	ZDI BZX83C6V8 6.8V 0.5W 5%	1	DZA 103
JH0059	ZDI BZX83C8V2 8.2V 0.5W 5%	1	DZA 101
JH0086	ZDI BZX83C4V7 4.7V 0.5W 5%	2	DZA 302
JH0087	ZDI BZX83C5V1 5.1V 0.5W 5%	1	DZA 201
JH0169	ZDI BZX55B3V9 3.9V 0.5W 2%	3	
JH4118	ZDI BZX84C12 0.225W 5% SOT-23	2	DZA 105
JH4122	ZDI BZX84C27 0.225W 5% SOT-23	2	DZA 102
JL0059	LED GREEN TLHG6205 5MM	2	LEDA 261
JL0069	OPTOCOUPLER VRMS 5KV	4	ICA 102 103
JM0202	TR MPSA44 N 400V 300MA TO92	3	TA 102 419
JM0205	TR BF423 P 250V 25MA 60M:	3	TA 315
JM0239	TR BC638 P 60V 1A 50M:	4	TA 106 111 301
JM0244	TR BF422 N 250V 25MA 60M: TO92	2	TA 312 316 408 412
JM0273	TR 2N5551 NPN 160V 0.6A	2	TA 107 313 314
JM0280	TR 2N5401 P 150V 0.6A 100M	2	TA 409
JM0285	TR BC637-16 N 40V 1A 60M:	4	TA 304 410
JM0342	TR 2SC5449 N 1500V 12A TO-3PFM	12	TA 407
JM4105	TR BC847B N 45V 0.1A SOT23	3	TA 103 115 116 302 307 310 401 205 418
JM4114	TR BC857B P 45V 100MA 150M:	2	TA 104 402 112 114 201 202 303 306 309 311
JM4401	TR BCR141W 50V 0.1A (2X22K)SOT323	2	TA 117
JS0030	FET IRF620 200V 5A 0.8R TO-220	7	TA 113
JS0055	FET IRLI520N N 100V 6.3A 0.28R	7	TA 415
JS0056	FET IRLI530N N 100V 11A 0.1R FI	9	TA 414
JS0058	FET IRF9620 P 200V 1R5 3A TO220FI	10	TA 305
JS0058	FET IRF9620 P 200V 1R5 3A TO220FI	10	TA 403
JS0063	FET IRFIBE30G N 800V 2.1A 3R0 220	23	TA 308
JS0071	FET STP6NA60FP N 600V 3.9A 1.2R	9	TA 101
JS0074	FET IRF610 N 200V 3.3A 1.5R TO220	5	TA 411
JS0076	FET IRLD120 100V 1.3A 0.27R HD-1	5	TA 416 417
JS1006	FET BS170 N 60V 500MA	10	TA 110
JS4003	FET IRLM110A N 100V 1.5A SOT223	6	TA 406
JZ0005	SILICONE INSUL. PAD 19*13*0.22MM	1	ICA 401
LM0603	IC LM2940CT LOW DROP REG.5V TO220	8	ICA 105

Part Number	Description	PG	Item Number
AJ3103	MO RES 2W0 2K7 J 6-17	2	RA 425
AJ3403	MO RES 2W0 47K J 6-17	2	RA 112
AQ0925	TPMET V15 10K RM 5X10 LIN CERMET	1	RTA 402
AQ2218	TPMET.AA H10 22K RM 5X10 6-HOLE	3	RTA 301
AQ2219	TPMET.AA H10 47K RM 5X10 6-HOLE	3	RTA 201
AQ2745	TPMET.AA V10 10K RM5X2.5 6-HOLE	1	RTA 401
AW0079	PTC-THERMISTOR 18R/25°C RM5	7	PTCA 101 102
AW0111	NTC-THERMISTOR 5R0/25°C RM5+2,5	7	NTCA 101
CA0322	CERCAP Y5P 2N2 K 1KV Y5: D10	2	CA 324
CA0324	CERCAP Y5P 100P K 1KV Y5 D8 L	2	CA 326 122 134 321
CB3129	CHIPCERCAP NP0 15P 50V J 0805	3	CA 213 214
CB3141	CHIPCERCAP NP0 47P 50V J 0805	1	CA 216 217 218 253 254
CB3151	CHIPCERCAP NP0 100P 50V J 0805	1	CA 212 117 210 320
CB3151	CHIPCERCAP NP0 100P 50V J 0805	1	
CB3159	CHIPCERCAP NP0 220P 50V J 0805	1	CA 315
CB3163	CHIPCERCAP NP0 330P 50V J 0805	1	CA 109 115
CB3167	CHIPCERCAP NP0 470P 50V J 0805	2	CA 312 317
CB3173	CHIPCERCAP NP0 820P 50V J 0805	1	CA 229 227
CB3175	CHIPCERCAP NP0 1N0 50V J 0805	3	CA 144 232 309 444 112
CC0110	CERCAP Y5P 150P K 500V Y5: D8	1	CA 404
CC0140	CERCAP Y5P 270P K 500V Y5: D8	1	CA 418 419
CC0150	CERCAP Y5P 330P K 500V Y5: D8	1	CA 332
CC0170	CERCAP Y5P 470P K 500V Y5: D8	1	CA 146
CC0170	CERCAP Y5P 470P K 500V Y5: D8	1	
CC0200	CERCAP Y5P 1N0 K 500V Y5: D9	1	CA 414
CC0240	CERCAP Y5P 2N2 K 500V Y5: D9	1	CA 123 420 319 405
CC0530	CERCAP Z5U 4N7 S 500V Y5: D9	1	CA 140 225 149 150
CC3280	CHIPCERCAP X7R 4N7 10% 50V 0805	1	CA 304 329 443 409
CC3320	CHIPCERCAP X7R 10N 10% 50V 0805	1	CA 143 201 208 224 303 318 230 415
CC3320	CHIPCERCAP X7R 10N 10% 50V 0805	1	CA 252
CC3565	CHIP CERCAP Y5V 22N Z 50V 0805	1	CA 226 145
CC3570	CHIP CERCAP Y5V 47N Z 50V 0805	1	CA 206
CC4855	CHIPCAP Y5V 100N Z 50V 1206	3	CA 108 110 119 245 207 209 215 234 237 307
CC4855	CHIPCAP Y5V 100N Z 50V 1206	3	CA 308 311 313 316 239 426 427 428 429 401
CC4855	CHIPCAP Y5V 100N Z 50V 1206	3	CA 242 256 221
CE0084	X2-CAP 220N M 275VAC Y22,5 PLAST.	1	CA 101
CE0116	Y-CAP 2N2 M 400VAC Y12,5 SDPJ16	4	CA 106 107
CE0126	Y-CAP 4N7 M 400VAC Y12,5 SDPJ21	4	CA 102 103
CE2154	IMPCAP 1N5 K 1K5V Y22,5 071528	4	CA 310
CE2286	IMPCAP 4N7 J 2KV Y22,5 122028	8	CA 412
CE2931	IMPCAP 100N J 250V Y15 081418	4	CA 413 425
CE3022	IMPCAP 220N J 250V Y22,5 091928	5	CA 424
CE3080	IMPCAP 390N J 250V Y15 SING.MET	4	CA 417
CE3113	IMPCAP 470N J 250V Y22,5 112128	5	CA 423
CE3202	IMPCAP 1U0 J 250V Y22,5 SING.MET	6	CA 422
CG2345	PPRCAP KP 220P J 63V Y5: 050608	2	CA 255
CG2717	PPRCAP KP 10N H 63V Y5: 060808	3	CA 111
CK0163	PESCAP MKT 22N K 250V Y10 051113	2	CA 402
CK0165	PESCAP MKT 22N K 630V Y10 061213	2	CA 120 121
CK0341	PESCAP MKT 220N K 100V Y10 051113	3	CA 449
CK0342	PESCAP MKT 220N K 250V Y5 080814	3	CA 410
CK0495	PESCAP MKT 2U2 K250V Y22,5 112227	10	CA 421
CK1388	PESCAP MKT 10N K 250V Y7,5 040911	2	CA 306 431 432
CK1468	PESCAP MKT 22N K 250V Y7,5 051011	2	CA 305
CK2464	PESCAP MKT 22N K 63V Y5: 030708	2	CA 411
CK2545	PESCAP 47N K 63V Y5: 030708	2	CA 325 328
CK2626	PESCAP MKT 100N K 63V Y5: 030808	2	CA 323
CK2663	PESCAP MKT 150N J 63V Y5: 040908	3	CA 243
CK2784	PESCAP MKT 470N K 63V Y5: 051008	3	CA 240
CK2864	PESCAP MKT 1U0 K 50V Y5:061108!	5	CA 302
CN0088	ELCAP 220U M 385V R10 85' 26X52	18	CA 105
CN0128	ELCAP 0U47 M 160V RM5: 7*13	3	CA 333
CN0204	ELCAP 2U2 M 50V RM5: 6*12	1	CA 202 203 204 301 228
CN0308	ELCAP 10U M 50V RM5: 6*12	1	CA 205 314 147 251
CN2017	ELCAP 1U0 M 50V RM5: 105' 6X12	2	CA 113 130 133 142 330
CN2435	ELCAP 47U M 35V RM5: 105' 9X12	2	CA 141 233 241 257
CN2435	ELCAP 47U M 35V RM5: 105' 9X12	2	CA 138
CN2461	ELCAP- 47U M 100V RM5 105, 10X16	4	CA 124
CN2521	ELCAP 100U M 25V RM5: 9*13	2	CA 238
CN2543	ELCAP 100U M 50V RM5 105 11X13	2	CA 446
CN2548	ELCAP 100U M 160V RM7.5 105 16X25	6	CA 135
CN2563	ELCAP 2U2F M 50V RM5: 105'5X12MM	2	CA 222
CN2575	ELCAP 22UF M 16V RM5: 105'6X13MM	1	CA 327
CN2581	ELCAP 220U M 35V RM5 105 11X13	3	CA 118 445 447
CN2712	ELCAP 1000U M 16V RM5: 105'11X21	5	CA 139 249
CN2775	ELCAP 2200U M 35V RM7.5 105'16X32	9	CA 136
CN3150	ELCAP, 4U7 M 50V RM5 105'05 X11	1	CA 223
CN3248	ELCAP, 47U M 200V RM5 105'13X26	1	CA 131 132 403
FJ0429	CHOKE 33UH 10% TAPED AXIAL	4	LA 201
FJ0516	CHOKE 1MH 5% TAPED AXIAL	2	LA 403
FJ0705	CHOKE 330UH TAPED AXIAL	2	LA 301
FJ0725	BEAD INDUCTOR MIN IMP360HM	2	FRA 201
FJ0725	BEAD INDUCTOR MIN IMP360HM	2	FRA 401
FJ0735	LEAD INDUCTOR 82UH 10% Y=5MM	7	LA 402
FJ0800	EMI/RFI CHOKE 60MH 3A(AC)	14	MA 101
FJ1832	INPUT CHOKE LFZ2404 2X10MH 1.1A	8	MA 102
FM0644	FLYBACK TRAFO 30..95KHZ HIT. 447U	30	MA 301
FM2560	DYNAMIC FOCUS TRAFO E20/6 445R	12	MA 404

Part Number	Description	PG	Item Number
AA0600	CF RES 0W25 1R0 J 2,5-7	1	RA 416 451
AA0621	CF RES 0W25 6R8 J 2,5-7	1	RA 135
AA0625	CF RES 0W25 10R J 2,5-7	1	RA 254 403 412
AA0633	CF RES 0W25 22R J 2,5-7	1	RA 423 316
AA0637	CF RES 0W25 33R J 2,5-7	1	RA 126
AA0641	CF RES 0W25 47R J 2,5-7	1	RA 406
AA0649	CF RES 0W25 100R J 2,5-7	1	RA 305 307 409 311
AA0657	CF RES 0W25 220R J 2,5-7	1	RA 329
AA0665	CF RES 0W25 470R J 2,5-7	1	RA 332 145 141 417 144
AA0665	CF RES 0W25 470R J 2,5-7	1	RA 250
AA0669	CF RES 0W25 680R J 2,5-7	1	RA 201
AA0673	CF RES 0W25 1K0 J 2,5-7	1	RA 325 164 318 413
AA0677	CF RES 0W25 1K5 J 2,5-7	1	RA 128 165
AA0681	CF RES 0W25 2K2 J 2,5-7	1	RA 167 304 306 118
AA0685	CF RES 0W25 3K3 J 2,5-7	1	RA 335
AA0689	CF RES 0W25 4K7 J 2,5-7	1	RA 133 301 211 212 420 120 429
AA0693	CF RES 0W25 6K8 J 2,5-7	1	RA 153 121
AA0695	CF RES 0W25 8K2 J 2,5-7	1	RA 324
AA0697	CF RES 0W25 10K J 2,5-7	1	RA 430 147 421 209 443
AA0705	CF RES 0W25 22K J 2,5-7	1	RA 136 163 441 208
AA0707	CF RES 0W25 27K J 2,5-7	1	RA 338 249
AA0709	CF RES 0W25 33K J 2,5-7	1	RA 160 452
AA0713	CF RES 0W25 47K J 2,5-7	1	RA 240
AA0721	CF RES 0W25 100K J 2,5-7	1	RA 110 426 427
AA0729	CF RES 0W25 220K J 2,5-7	1	RA 328 256 419
AA0731	CF RES 0W25 270K J 2,5-7	1	RA 137
AA0737	CF RES 0W25 470K J 2,5-7	1	RA 104 105 106 107
AA0754	CF RES 0W25 2M2 J 2,5-7	1	RA 327
AA0761	CF RES 0W25 4M7 J 2,5-7	1	RA 102 103 113 114
AB0585	NF RES 0W25 0R22 J 2,5-7 CF	1	RA 115 319
AB0595	NF RES 0W25 0R56 J 2,5-7 CF	1	RA 129 130
AB0605	NF RES 0W25 1R5 J 2,5-7 CF !	1	RA 448
AB0617	NF RES 0W25 4R7 J 2,5-7 CF	1	RA 131 151
AB0641	NF RES 0W25 47R J 2,5-7 CF	1	RA 170
AB0653	NF RES 0W25 150R J 2,5-7 CF	1	RA 339
AC3369	CHIPRES 6K19 0W1 1% 0805	1	RA 236
AC4400	CHIPRES 0W1 0R0 5% 0805 2013	1	JA 803 800 801 802
AC4400	CHIPRES 0W1 0R0 5% 0805 2013	1	RA
AC4425	CHIPRES 0W1 10R 5% 0805 2013	1	RA 418 445
AC4433	CHIPRES 0W1 22R 5% 0805 2013	1	RA 313 314 271
AC4441	CHIPRES 0W1 47R 5% 0805 2013	1	RA 227 228 229 336
AC4449	CHIPRES 0W1 100R 5% 0805 2013	1	RA 125 431 432 433 434
AC4457	CHIPRES 0W1 220R 5% 0805 2013	1	RA 275
AC4465	CHIPRES 0W1 470R 5% 0805 2013	1	RA 168 415
AC4471	CHIPRES 0W1 820R 5% 0805 2013	1	RA 302 310
AC4473	CHIPRES 0W1 1K0 5% 0805 2013	1	RA 166 303 232 233 267 321
AC4479	CHIPRES 0W1 1K8 5% 0805 2013	1	RA 234
AC4481	CHIPRES 0W1 2K2 5% 0805 2013	1	RA 127 315 317 333
AC4483	CHIPRES 0W1 2K7 5% 0805 2013	1	RA 221 222
AC4487	CHIPRES 0W1 3K9 5% 0805 2013	1	RA 119 414
AC4489	CHIPRES 0W1 4K7 5% 0805 2013	1	RA 134 157 202 203 204 210 246 206 217
AC4489	CHIPRES 0W1 4K7 5% 0805 2013	1	RA 218 219 220 402 207 442
AC4493	CHIPRES 0W1 6K8 5% 0805 2013	1	RA 263
AC4495	CHIPRES 0W1 8K2 5% 0805 2013	1	RA 205 158 278
AC4497	CHIPRES 0W1 10K 5% 0805 2013	1	RA 255 124 146 237 152 265 155 323 269
AC4497	CHIPRES 0W1 10K 5% 0805 2013	1	RA 213 214 215 216 312 276 264 449 450
AC4501	CHIPRES 0W1 15K 5% 0805 2013	1	RA 262 440 436 272 281 284
AC4505	CHIPRES 0W1 22K 5% 0805 2013	1	RA 111 154 283 334 337
AC4509	CHIPRES 0W1 33K 5% 0805 2013	1	RA 273
AC4511	CHIPRES 0W1 39K 5% 0805 2013	1	RA 162 261
AC4513	CHIPRES 0W1 47K 5% 0805 2013	1	RA 223 226 122 320 330 435 231 268
AC4517	CHIPRES 0W1 68K 5% 0805 2013	1	RA 117
AC4519	CHIPRES 0W1 82K 5% 0805 2013	1	RA 123
AC4521	CHIPRES 0W1 100K 5% 0805 2013	1	RA 156 241 235 340 266 279
AC4537	CHIPRES 0W1 470K 5% 0805 2013	1	RA 224
AC4545	CHIPRES 0W1 1M0 5% 0805 2013	1	RA 169
AC4557	CHIPRES 0W1 3M3 5% 0805 2013	1	RA 428
AC4561	CHIPRES 0W1 4M7 5% 0805 2013	1	RA 140
AC4569	CHIPRES 0W1 10M 5% 0805 2013	1	RA 225
AD0349	COMPRES 0W5 100R K 4-11	1	RA 331
AD0445	COMPRES 0W5 1M0 K 4-11	1	RA 101
AG3101	MF RES 0W5 1R00 F TC50 2,5-7	1	RA 446
AG3343	MF RES 0W5 274R F TC50 2,5-7	1	RA 447
AG3433	MF RES 0W5 2K15 F TC50 2,5-7	1	RA 161
AG3465	MF RES 0W5 4K64 F TC50 2,5-7	1	RA 444
AG3501	MF RES 0W5 10K0 F TC50 2,5-7	1	RA 148 150
AG3505	MF RES 0W5 11K0 F TC50 2,5-7	1	RA 404
AG3519	MF RES 0W5 15K4 F TC50 2,5-7	1	RA 309
AG3551	MF RES 0W5 33K2 F TC50 2,5-7	1	RA 108 109
AG3565	MF RES 0W5 46K4 F TC50 2,5-7	1	RA 308
AG3601	MF RES 0W5 100K F TC50 2,5-7	1	RA 159 274
AG3657	MF RES 0W5 383K F TC50 2,5-7	1	RA 282
AJ2503	MO RES 2W0 8R2 J 6-17	2	RA 142 143
AJ2643	MO RES 2W0 33R J 6-17	2	RA 410
AJ2663	MO RES 2W0 39R J 6-17	2	RA 411
AJ2703	MO RES 2W0 56R J 6-17	2	RA 424
AJ2763	MO RES 2W0 100R J 6-17	2	RA 422
AJ3003	MO RES 2W0 1K0 J 6-17	2	RA 149 132

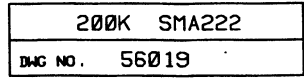
Part Number	Description	PG	Item Number		
LM0763	IC UC3842 CURRENT MODE PWM CONT.	12	ICA	101	
LM0942	IC TL431 VOLTAGE REFERENCE TO-92	4	ICA	104	
LM0945	IC 24C64 SERIAL EEPROM 8X8K DIP-8	16	ICA	202	
LM0956	IC TDA9309 VERT.DEFL.BOOSTER HWAT	8	ICA	401	
LM0957	IC UC3843 CURR.MODE PWM CON.DIP-8	6	ICA	302	
LM0967	IC SI-3120FA 12V LOWDROP REG 2%	6	ICA	106	
LM1301	IC TDA9109/N DEFL.PROC. SHRINK32	17	ICA	205	
LM4111	IC 4538BT	5	ICA	206	
LM4114	IC 4050B HEX BUFER SO-16	4	ICA	301	
LM4208	IC 74HC86 2-INPUT EXCL. OR SO-14	4	ICA	203	
LM4420	IC DUAL MODE EEPROM FOR DDC 2.0	2	ICA	204	
LM4439	IC ST72T753 8-BIT MCU 32K SOP34	24	ICA	201	
QA0098	CRYSTAL 24.000MHZ FUNDAM. HC-49/U	6	XA	201	
QG0309	PUSH-BUTTON SWITCH 12V 50MA MOM.	3	SWA	201	202 203
QG0329	MINIATURE PUSH SWITCH 0.1A 24VDC	10	KA	201	
QH0074	RELAY PCB-MOUNTING 12V 5A/250VAC	11	REA	101	
QK0851	TAP CONN RTM 1,3/5/8.002	1	QA	404	
QK1284	ROW CONN 1X02 7,62 VERT/LOCK	2	QA	102	
QK1287	PIN STRIP 1X04 8,0/10.0 VERT MALE	3	QA	401	
QK1446	WIRE TERMINAL FOR 1,85MM HOLES	1		002	
QK1446	WIRE TERMINAL FOR 1,85MM HOLES	1		002	
QK1463	"ROW CONN "JST" 1X02 2,5 VERT"	2	QA	301	
QK1575	BLADE CONN 4,8MM FEM FOR 0,4MMTAB	1		003	
QK1651	"BLADE CONNECTOR "MIKROLOK" 6,3MM"	1		003	
QK1753	AC INLET FOR PCB MOUNTING SNAP-IN	1	QA	101	
QM1054	PICOFLEX ASSY BI-IDC 18-POS 450MM	12	QA	201	
QT0002	SPARK GAP 1,2KV +-500V R=5,0MM	3	GLA	302	303
QT0102	FUSEHOLDER CLIPS 5*20MM R=5,0MM	1	FA	101	
QT0207	GLIMM LAMP 95V 6*12,5MM	4	GLA	301	
QT0776	FUSE 5*20MM T 4.0A 250V 1500A	3	FA	101	
QT4000	CHIP FUSE 2.0A UL/CSA 1206	5	FA	104	105
SE2404	GROUNDING WIRE L=100MM 44BQ	6	WA	102	
SE2688	FLAT CABLE L=200 4-POLE 447I	3	QA	203	205
SE2739	FLAT CABLE VERT 3-POL446B	3	QA	402	403
SE2748	GROUNDING WIRE 447I	4	WA	301	
UC0859	FASTENING SPRING PN44473	2	TA	305	308 403 113
UC0859	FASTENING SPRING PN44473	2	ICA	106	
UC1140	COOLING PLATE PN45154	2	TA	305	308 403 113
UC1142	COOLING PLATE PN45204	3	ICA	106	
UC6551	FASTENING SPRING	3	ICA	401	
UC6551	FASTENING SPRING	3	TA	414	101
UC6551	FASTENING SPRING	3	DA	402	
UC6552	FASTENING SPRING	3	TA	407	
UC6995	COOLING PLATE 447Y	15	TA	101	
UC7013	COOLING PLATE 447I	23	TA	407	414
UC7013	COOLING PLATE 447I	23	DA	402	
UC7014	COOLING PLATE 447I	23	ICA	401	
UCX012	COOLING PLATE ASSY JF0166	5	DA	120	
UJ0125	TIES SST 1 M	1			
UJ0251	TIES PN30181 447S	4			
XW0032	DOW CORNING	9	TA	101	407
XW0032	DOW CORNING	9	DA	402	
XW0032	DOW CORNING	9	ICA	401	

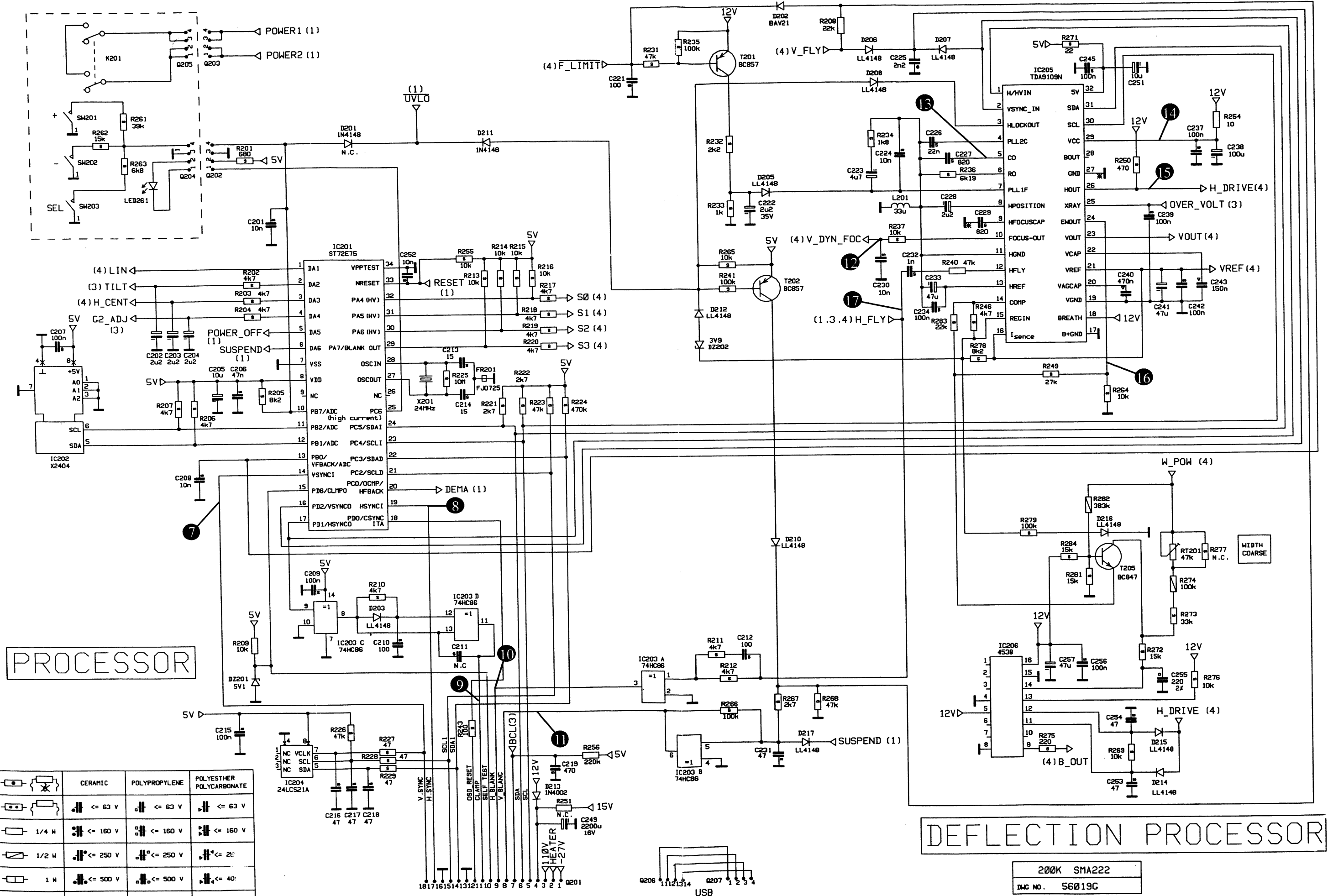


ECN
4471

4471 SMH154, SMH159
Dwg NO. 52065

	Ceram	Polypropylen	Polyester Polycarb.
	$\leq 63V$	$\leq 63V$	100V
	1/4W	160V	160V
	1/2W	250V	250V
	1W	500V	400V
	2W	1.5kV	1.5kV



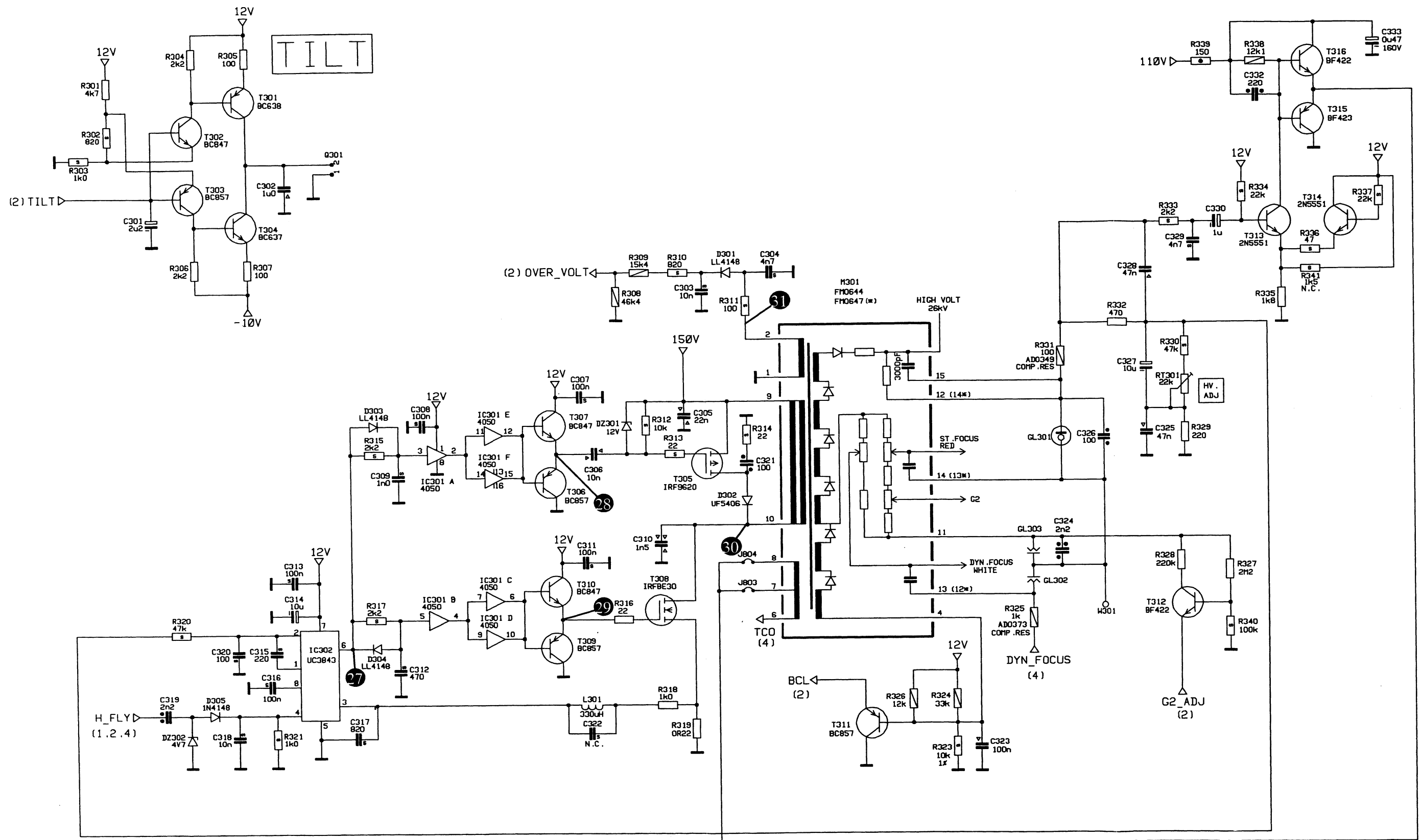


PROCESSOR

DEFLECTION PROCESSOR

	CERAMIC	POLYPROPYLENE	POLYESTHER POLYCARBONATE
	<= 63 V	<= 63 V	<= 63 V
	<= 160 V	<= 160 V	<= 160 V
	<= 250 V	<= 250 V	<= 250 V
	<= 500 V	<= 500 V	<= 400 V
	<= 1,5 kV	<= 1,5 kV	<= 1,5 kV

200K SMA222
DWC NO. 56019C



	CERAMIC	POLYPROPYLENE	POLYESTHER POLYCARBONATE

HV GENERATOR

200K SMA222
DWC NO. 56019

